

DESKMATE: The Tandy 1000's Bundle of Joy

May 1985
USA \$4.00
Canada \$4.50

80micro

A CWC/I PUBLICATION

the magazine for TRS-80* users

Write Your Own **SIMULATIONS**

Fight Simulator
Shows You How



New Column
Great Spreadsheet
Tips and Templates

Surge Stompers
Save Your Micro
From Blowing Up

Scroll Protect
For the Model 4

The Ultimate
Input Routine



Circle 75 on Reader Service card.

TANDY... Clearly

It's evident when you can cover the MS-DOS unmatched in performance and value.

Advanced Technology Tandy 2000

The Tandy 2000 is the standard of excellence for MS-DOS based personal computers. Like IBM's PC AT, the Tandy 2000 performs up to three times faster than the IBM PC*. Each Tandy 2000 disk drive offers over twice

the PC's storage. And our color graphics offer twice the resolution, with twice as many colors.

The Tandy 2000 comes with the industry standard MS-DOS operating system that lets you use the most popular and sophisticated programs on today's market.

Programs like Lotus 1-2-3, dBase II, Multiplan, the pfs:series and SuperCalc3.

Tandy 2000 delivers a better solution—extraordinary quality with higher performance. A 256K Tandy 2000 starts at just \$2499. Your company can lease a system for only \$95 a month**.



Engineered for Excellence

We've been bringing the latest in electronic technology to the marketplace for over 60 years. The Tandy 2000 and the Tandy 1000 represent the state of the art in technology, quality and price breakthrough.

Superior™

market with a line of computers

New Low Price on the XT's "Mirror Image"

Here's a system that does everything IBM's XT can—but costs considerably less. A Tandy 1200 HD is compatible with virtually all software and hardware for the XT, yet is now only \$2499. And that includes 256K, a ten megabyte hard disk and a parallel printer interface.

The New Tandy 1000

And if you want more than just PC compatibility, then you need the new Tandy 1000. Tandy 1000 puts it all together—including software. We call it DeskMate™, and it's word processing, spreadsheet analysis, electronic filing, telecommunications, a calendar and electronic mail all on one disk.

And unlike IBM's PC, the Tandy 1000 includes adapters to use a monitor, printer, joysticks and light pen, as well as DOS and BASIC. With one-disk it's only \$1199.

For the best in technology, support, service and value, stop by your local Radio Shack Computer Center today. We invite comparison!



Available at over 1200
Radio Shack Computer Centers and at
participating Radio Shack stores and dealers.

Radio Shack®
COMPUTER CENTERS
A DIVISION OF TANDY CORPORATION

*80 Micro Magazine, May 1984. **Plus applicable use/sales tax. Tandy 2000, 1200 HD and 1000 prices do not include monitors and apply at Radio Shack Computer Centers and participating stores and dealers. Tandy 1200 HD was \$2999 in Cat. RSC-14. MS/registered TM Microsoft Corp. IBM/registered TM International Business Machines Corp. 1-2-3/TM TM Lotus Development Corp. dBASE II/TM Ashton-Tate. Multiplan/TM Microsoft Corp. pfs/registered TM Software Publishing. MultiMate/TM MultiMate International, Inc. SuperCalc/registered TM/Sorcim Corp.

Send me a 1985 Computer Catalog.

Mail To: Radio Shack, Dept. 85-A-387
300 One Tandy Center, Fort Worth, TX 76102

Name _____
Company _____
Address _____
City _____
State _____ Zip _____
Telephone _____

The Best Gets BETTER: JMG Now Offers FREE SHIPPING!

In an effort to give our customers even better value for their software dollar, we have now eliminated shipping charges for all orders over \$25 to the continental US or Canada. Simple. Except for an extra charge if you order by COD, there are no other charges at all. The price you see is the price you get. Someday, all dealers will sell this way, but for now you'll just have to stick with the best — JMG Software.

NEW! **INFOCOM**

HITCHHIKERS GUIDE TO THE GALAXY

Douglas Adams and Steve Meretzky have adapted Adams' best selling book into an interactive adventure game. Infocom has some great games, but this is one of the best!

Model 3/4 only (unfortunately) \$34.50

ACCEL 3/4 Basic Compiler

This compiler from Southern Software and Allen Gelder is one of the best; it compiles almost all BASIC commands, and produces fast machine language programs.

ACCEL 3/4, Mod 1/3 Disk \$89.50

JMG has recently expanded its line with some excellent programs, and here is a run-down of the new guys on our software block:

T/MAKER

This integrated software package for the Model 4 combines word processing, spelling checking, spreadsheet, data base management, and graphics all into one package. An excellent over-all package, and a great price.

T/Maker, Mod 4 only (List \$299) \$269.50

ENBase

This is a "relational data base manager" and what that all boils down to is a very powerful program. This will handle most any data base job you can throw at it, and more.

ENBASE, Model 1 or 3 (List \$140) \$129.50

DIS'n'DATA Dissassembler

This is a dissassembler with a unique and efficient way of automatically separating data areas from machine language code. It's not 100% foolproof, but it is as close as you can get.

DIS'n'DATA Model I/III Disk \$37.50

DIS'n'DATA Model 4 \$46.50

OTHERS:

Disk Drive Analyzer, Model I \$84.50

Disk Drive Analyzer, Model 3/4 \$74.50
(Does what it says, list \$89/\$79)

PASCAL80 Model I/III \$69.50

PASCAL80 for CP/M \$36.50
(A well-praised Pascal Compiler)

EDIT Mod I/III from Allen Gelder \$36.50
(A full-screen editor for BASIC)

SBE from Allen Gelder \$94.50
("Mid-level language compiler" ...)

VersaBusiness Series \$89.50
(AR, AP, Payroll & Inventory available)

Versaledger II \$134.50

CNVBASIC for Mod I/III or 4 \$27.50
(Powersoft's entry in the conversion club)

And there's more new stuff coming!

LESCRIPT \$94.50

Our best selling word processor, loaded with features (many not found elsewhere).

Great printer support, ease of use, full Model 4 support, and much more! On a 128K Model 4 you can have over 90K of text buffer for use on a single file (not split into multiple buffers, like other WP programs do). Model 4 features also available while running in Model III mode! The same program will run under most DOSes from TRSDOS 2.3 on a model I to DOSPLUS IV on a mod 4! And at our low price, it's the best word processing value anywhere.

LESCRIPT Models I/III/4 (List \$129.95) \$94.50

ELECTRIC WEBSTER . . . \$119.50

The best Spelling checker for TRS-80 computers; includes a 50,000 word dictionary and integrates with most word processors. Features fast checking, interactive correcting, and the ability to add your own words to its dictionary. Not much more you can say about this program, just that it does the job and it does it very well. (Get it quick before the price goes up to \$129.50) Specify computer & word processor when ordering.

Electric Webster Model I/III or 4 (List \$149.95) \$119.50
E.W. Grammar or Hyphenation (List \$49.95) \$38.50

WORDPROCESSING PACKAGE DEAL \$199.50

Buy both LSCRIPT and ELECTRIC WEBSTER together and save even more! These two programs work great together, so if you're getting into serious word processing this is the "first class" way to go. This is a special offer for, as they say, "a limited time."

SAVE \$80 OFF THE LIST PRICE!!

KSoft's LOG and SUPERLOG

Very versatile "Electronic Notebook" programs that allow you to access stored information at the touch of a key, even when running other programs. Keep notes, memos, lists, or other information in the instantly accessible "pages". SUPERLOG4 for the Model 4 also contains many advanced features and commands that will make you wonder how you ever lived without the program.

LOG for Model I or III \$44.50
SUPERLOG for Mod I or III LDOS \$99.50

SUPERLOG4 for Mod 4 (List \$119.95) \$99.50

DOSPLUS 3.5 and DOSPLUS IVa

DOSPLUS is an excellent alternative to TRSDOS for Models I/III and Model 4. As they say, it's "better, faster and stronger"; in this case stronger means more powerful. Both versions come bundled with many utilities that are alone worth the price. It won't leap tall buildings in a single bound, but it will do the next best thing, which is to make life a little easier for you.

DOSPLUS 3.5 for Model I or III \$ 59.50
DOSPLUS IVa for Model 4 (List \$169.95) \$119.50

The Home Accountant \$59.50

A complete personal finance package. A thorough program; somewhat slow, but otherwise a very good package.

Home Accountant, Model III only \$59.50

TAS Public Domain Disks

These disks are a collection of quality public domain programs from all over. There's lots of stuff here, from games to utilities to applications and much more. Each disk is a "floppy" disk, and both sides are filled to the brim.

Public Domain Disk Package, #1 to #4 \$34.50

Public Domain Disk Package, #1 to #6 \$49.50

Single Disk (specify 1 to 6) \$ 9.50



THE SOURCE OF TRS-80 SOFTWARE!

IF YOU BOUGHT YOUR SOFTWARE ELSEWHERE, YOU PROBABLY PAID TOO MUCH

JMG is one of the largest sources for TRS-80 software around; we specialize in software for Models I, III and 4. Our prices are the best, and if you find a better price then we'll beat it (see below). As well, we support the programs we sell; we sell only top-quality software, and our 99% satisfaction rate speaks for itself. With the best prices, selection and support on your side, you can't lose. Model 4 owners: ALL Model 3 programs we sell will work on the Mod 4 in "III mode".

APPLICATIONS/BUSINESS

Program Name	(List)	JMG
DOTWRITER w/LDS	(99.95)	\$ 89.50
POWERDOT II	(59.50)	\$ 49.50
DATAGRAPH	(79.95)	\$ 69.50
Mumford's Disk Indexer	(39.95)	\$ 34.50
Howe's System Diagnostic	(99.95)	\$ 89.50
J&M's Disk Drive Analyzer - I	(89.00)	\$ 84.50
J&M's Disk Drive Analyzer - III	(79.00)	\$ 74.50
ENBASE Data Base Manager	(140.00)	\$129.50
POWERMAIL PLUS	(150.00)	\$129.50
POWERMAIL w/Txmg	(175.00)	\$149.50
TAS's ZMAIL Mail List	(29.95)	\$ 24.50
LESCRIPT	(129.95)	\$ 94.50
LESCRIPT CP/M	(199.95)	\$149.50
ZORLOF II	(69.95)	\$ 49.50
LAZYWRITER	(125.00)	\$ 99.50
TYPEITALL	(129.95)	\$ 99.50
PowerScript (New Ver)	(39.95)	\$ 34.50
ELECTRIC PENCIL	(89.00)	\$ 79.50
TEXPRESS	(49.95)	\$ 39.50
ELECTRIC WEBSTER	(149.95)	\$119.50
E.W. Options (each)	(49.95)	\$ 38.50
Home Accountant	(79.95)	\$ 59.50
VersaLedger II	(149.95)	\$134.50
Versa Series (each)	(99.50)	\$ 89.50

UTILITIES

SUPER UTILITY 4/4P	\$ 69.50
SUPER UTILITY 3.2	\$ 59.50
SUPERCROSS XT	\$ 94.50
SUPERCROSS XT w/CnvBasic	\$112.50
EDAS / PRO-CREATE	\$ 69.50
ALE - Assem. Lang Editor	\$ 39.50
M-ZAL Macro Assembler	\$ 79.50
Mumford's Instant Assembler	\$ 44.50
Instant Assembler Model 4	\$ 59.50
ZEN Assembler	\$ 34.50
DSMBLR III / PRO-DUCE	\$ 23.50
DIS'n' DATA I/III	\$ 37.50
DIS'n' DATA Mod 4	\$ 46.50
TASMON Monitor I/III or 4	\$ 34.50
Howe's Monitor #5	\$ 19.50
LC / PRO-LC Compiler	\$114.50
PASCAL80 Compiler	\$ 69.50
PASCAL80 for CP/M	\$ 36.50
SBE Compiler	\$ 94.50
ACCEL 3/4-Compiler	\$ 89.50
ZBASIC Compiler	\$ 79.50
Model 4 Toolbelt	\$ 39.50
PRO-ESP Utility set (Mod 4)	\$ 23.50
6.2 Plus Enhancements	\$ 36.50
BAS 3-to-4 Converter	\$ 24.50
Lazycomm terminal	\$ 29.50
DISK TERM Terminal	\$ 59.50
MULTIDOS Version 1.6 b	\$ 49.50
MULTIDOS Version 1.7	\$ 79.50
MULTIDOS Model 4	\$ 89.50

GAMES

SUPREME RULER PLUS	\$26.50
FLIGHT SIMULATOR	\$29.50
NUCLEIX	\$14.50
APE	\$14.50
SIFTER SHIFTER	\$ 8.50
BATTLE OF ZEIGHTY	\$ 8.50
FOREST FIRE DISPATCH	\$26.50

INFOCOM GAMES:

"Standard Level"	Each \$34.50
PLANETFALL	WITNESS
ENCHANTER	HITCHHIKER'S
"Intermediate Level"	Each \$39.50
ZORK II	ZORK III
SORCERER	INFIDEL
"Very Difficult Level"	Each \$42.50
DEADLINE	STARCROSS
SUSPENDED	

OTHER GOODIES:

BOOKS:	
ROM ROUTINES Documented	\$16.50
Model III Assembly Language	\$15.50
Microsoft Basic Decoded	\$23.50
TRSDOS 2.3 Decoded	\$23.50
BASIC Faster & Better	\$23.50
BFBLIB or BFBDEM Disks	each \$16.50
BASIC Disk I/O F & B	\$23.50
DFBLOAD disk	\$16.50
DISKS:	
On a trial basis we are offering Wabash "Datatech" blank diskettes for sale. Lifetime guarantee, in soft box with labels etc. These are Single Side Double Density (other formats available).	
SSDD Wabash (10 pack)	\$15.00

OUR NEW PHONE NUMBER: (416) 575-2867

Use this number for ordering and for technical information. Phones are usually staffed Monday to Saturday, 10 A.M. to 7 P.M. (No technical info on Wednesday.)

OUR PRICING POLICY:

We will beat any legitimate price advertised for any product that we carry. If you find a lower price advertised, our price will be \$1.00 less, under the same conditions (eg. same shipping and other charges, etc). To receive the lower price you must mention the location of the other ad when ordering.

TO ORDER:

We accept orders by phone or mail. When ordering please specify the Model of TRS-80 you own, the exact program(s) wanted, and the method of payment. We accept Check, Money Order, VISA, MasterCard. (For Electric Webster please mention your word processor.) (For Dotwriter & PowerDot mention your printer brand.)

AN APOLOGY:

This is an open apology to Powersoft and Hypersoft for a mistake we made in our original pricing of their new product, Hypercross/Supercross. While controlling dealer prices is illegal ("pricefixing"), it is JMG's policy to co-operate with our suppliers as much as possible and observe their concerns. Both companies would like to maintain a stable market for their new program, so we'd like to apologize to them and any other people affected by our inappropriate pricing. Thank you.

THIS AND THAT:

Hope you like our latest ad... keep your eyes open for new things coming soon, such as even more new products. Also, we will soon venture into the Model 1000 world (don't worry, we won't leave I/III/4 behind). This isn't all we have, by the way; write for a complete product/price list and our latest newsletter. Canadians: write for our Canadian price list. Till next month - The Prez.

OUR GUARANTEE:

We sell only top-quality software. If, however, you are unsatisfied with a product you have purchased from JMG, you may return it (in good condition) within 10 days for a refund, less a \$2.50 handling charge for programs under \$50 (\$5.00 for programs over \$50). We also ask that you send us a letter stating the reason for your return.

**JMG SOFTWARE
INTERNATIONAL**

THE FINE PRINT:

Regular shipping in continental US and Canada is FREE (our choice of method). COD orders add \$2.50 to cover COD costs. PO's accepted for gov't & schools, add \$5.00 handling charge. Overseas orders will be charged actual shipping costs; specify surface or air. All prices subject to change without notice.

3235 LOCKPORT ROAD
NIAGARA FALLS, NY 14305

OR

710 UPPER JAMES ST.
HAMILTON, ONTARIO
CANADA L9C 2Z8

Phone: (416) 575-2867

NEW!

IS YOUR PRINTER TOO SHORT FOR YOUR SPREADSHEET?

LONGVIEW turns a VisiCalc (R) spreadsheet on its side so that DOTWRITER can print it down the paper instead of across. It gives you the effect of a 400-character wide printer (or even longer, if your spreadsheet is that big).

The number of "rows" becomes the limit when you print this way: you can fit between 48 (Microline 92) and 180 (C.ITOH 1550) rows across the page.

LONGVIEW is an "add-on" to our Dotwriter system. It includes programs and three character sizes, and runs on 48K-64K TRS-80 Models I, III, and 4/4P (native Model 4 mode). Please see our ad later in this magazine for information and pricing on Dotwriter, and the printers we support.

LONGVIEW is easy to use and comes with ready-to-run setups. First, tell VisiCalc to print your spreadsheet to disk. Next, rotate the file with LONGVIEW. Then, print it with Dotwriter. That's all there is to it.

LONGVIEW \$29.95

(does not include Dotwriter or VisiCalc)

DOWNLOADABLE FONTS

We have dozens of high-resolution, downloadable fonts for the Radio Shack DMP 2100P and the Epson LQ-1500. They include italics, cursive, headline, and other fancy typefaces. Each font disk includes programs to perform the download, and sample files to print them for you.

The print quality of these fonts must be seen to be believed. ALLWRITE can load these fonts "on the fly" and give you right-justified, proportional printing. If you do not have ALLWRITE, you can pre-load a font and use it with any software, including BASIC (right-justification is only possible with ALLWRITE, however).

Each disk contains at least eleven fonts and supporting programs. The disks cost \$59.95 each, and we

offer substantial discounts to ALLWRITE owners. Please call or write to us for print samples, further information and pricing. Due to the specialized nature of this product, we recommend that you see the samples before ordering. Disk formats are available for TRS-80 I, III, 4, and MS-DOS. ALLWRITE is available only for TRS-80.

Information on these products is not available at our toll-free answering service, so please call or write to our Technical Support group for details:

(818) 764-3131

PROSOFT®

Box 560, No. Hollywood, CA 91603

Please add \$3.00 for shipping. Calif. residents add sales tax. We accept M/C, VISA, checks and C.O.D.

PUBLISHER

Peter Hutchinson

EDITOR-IN-CHIEF

Eric Maloney

MANAGING EDITOR (EDITORIAL)

Peter E. McKie

MANAGING EDITOR (PRODUCTION)

Deborah M. Sargent

REVIEW EDITOR

Ryan Davis-Wright

COPY EDITORS

Robert Mitchell (New Products)

Penelope Hamblin

ASSISTANT EDITOR

Catherine Geary

TECHNICAL EDITORS

Bradford N. Dixon

Mare-Anne Jarvea

Keith Johnson (Load 80)

Dave Rowell

Beverly Woodbury

PROOFREADER

Vinoy Laughner

EDITORIAL ADMINISTRATION

Carol Maciocci

ASSOCIATE EDITORS

Hardin Brothers

David Engelhardt

John B. Harrell III

Terry Kepner

Thomas L. Quindry

ADVERTISING SALES

SALES MANAGER

William Smith

SALES REPRESENTATIVES

Richard J. Alden

Michael Wozniak

1-800-441-4403

WEST COAST OFFICE

1060 Marsh Road

Menlo Park, CA 94025

415-328-3470

SALES REPRESENTATIVE

Alison Walsh

MARKETING/PROMOTION DIRECTOR
Jane Butterfield

MPA



Cover Photograph by Edward Justice

The left bracket, [, replaces the up arrow used by Radio Shack to indicate exponentiation on our printouts. When entering programs published in 80 Micro, you should make this change.

80 formats its program listings to run 64-characters wide, the way they look on your video screen. This accounts for the occasional wrap-around you will notice in our program listings. Don't let it throw you, particularly when entering assembly listings.

Article submissions from our readers are welcomed and encouraged. Inquiries should be addressed to: Submissions Editor, 80 Pine Street, Peterborough, NH 03458. Include an SASE for a copy of "How to Write for 80 Micro." Payment for accepted articles is made at a rate of approximately \$50 per printed page; all rights are purchased.

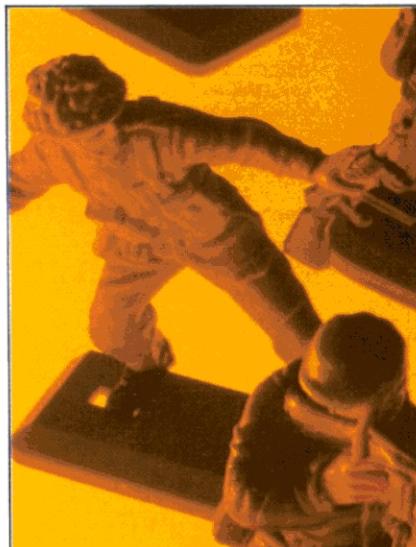
*TRS-80, Scripter, and TRSDOS are trademarks of Radio Shack, a division of Tandy Corp.

80 Micro (ISSN-0744-7868) is published monthly by CW Communications/Peterborough Inc., 80 Pine St., Peterborough, NH, 03458. Phone: 603-924-9471. Second class postage paid at Peterborough, NH, and additional mailing offices. (Canadian second class mail registration number 9563.) Subscription rates in U.S. are \$24.97 for one year, \$38 for two years, and \$53 for three years. In Canada and Mexico \$27.97—one year only; U.S. funds drawn on a U.S. bank. Nationally distributed by International Circulation Distributors. Foreign subscriptions (surface mail), \$44.97—one year only; U.S. funds drawn on a U.S. bank. Foreign subscriptions (air mail) please inquire. In South Africa contact 80 Micro P.O. Box 782615, Sandton, South Africa 2146. All subscription correspondence should be addressed to 80 Micro, Subscription Department, P.O. Box 981, Farmingdale, NY 11737. Please include your address label with any correspondence. Postmaster: Send address changes to 80 Micro, Subscription Services, P.O. Box 981, Farmingdale, NY 11737. Send Canadian changes of address to 80 Micro, P.O. Box 1051, Fort Erie, Ontario L2A 5N8, Canada. Return postage guaranteed.

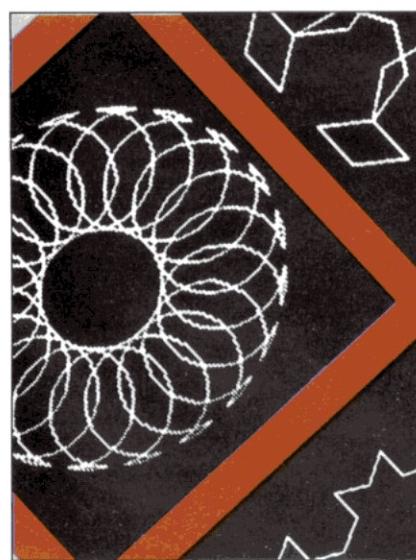
Entire contents ©copyright 1985 by CW Communications/Peterborough Inc. No part of this publication may be reprinted, or reproduced by any means, without prior written permission from the publisher. All programs are published for personal use only. All rights reserved.



page 31



page 40



page 58

On the Cover

- 31. DeskMate: Tandy's Software Starter Package**
by Bradford N. Dixon
In this case, you get what you don't pay for.
- 40. Fight Simulator**
by Joe R. Capps
An inside look at the design and coding of an armed combat simulation program. Plus, a list of simulation software for Tandy computers. (Models I, III, and 4; Load 80; Model 1000)
- 62. Current Events**
by Mark D. West
A consumer's guide to surge protectors.
- 70. Restricted Entry**
by José E. Anaya
Keep bogus input from sneaking into your programs. (Models I, III, and 4; Load 80; Models 1000, 1200, and 2000)
- 74. Stationary Department**
by Raymond C. Boggs
Add scroll protection to your Model 4's video display. (Model 4; Load 80)
- 106. Spreadsheet Beat**
by Russ Couey
Our new monthly column debuts with a template for analyzing IRA investment funds.

Feature

- 58. Fractals in Focus**
by Steve Justice
High-resolution graphics add finesse to geometric fractal designs. (Models III and 4; Load 80; Models 1000 and 1200)

Departments

- | | |
|--|---|
| <ul style="list-style-type: none"> 6. Load 80 Directory 8. Side Tracks
<i>by Eric Maloney</i> 12. Input 14. Feedback Loop
<i>by Terry Kepner</i> 22. Pulse Train
<i>by Bradford N. Dixon</i> 27. Reader Exchange 29. Debug 31. Reviews
<i>edited by Ryan Davis-Wright</i>
DeskMate
LS-Utility Disk
EasyWriter and Volkswriter Deluxe
Convert 3 to 2000 | <ul style="list-style-type: none"> 78. Project 80
<i>by Roger C. Alford</i> 92. BBS Express
<i>by J. Stewart Schneider and Charles E. Bowen</i> 96. Basic Takes
<i>by Richard Ramella</i> 100. The Next Step
<i>by Hardin Brothers</i> 106. Spreadsheet Beat
<i>by Russ Couey</i> 115. Tidbit #20 120. New Products
<i>edited by Robert Mitchell</i> 128. Ask Tandy |
|--|---|

LOAD 80

Load 80 gathers together selected programs from this issue of *80 Micro* and puts them on a magnetic medium for your convenience. It is available on tape or disk, and runs on the Models, I, III, and 4.

Load 80 programs are ready to run, and can save you hours of time typing in and debugging listings. Load 80 also gives you access to Assembly-language programs if you don't have an editor/assembler. And, it helps you build a substantial software library.

Using Load 80 is simple. If you own a tape system, load the Load 80 tape as

per the instructions provided. If you own a Model I or III disk system, you boot the Load 80 disk and transfer the files to a TRSDOS system disk according to simple on-screen directions. If you own a Model 4, you must convert the programs from Model III TRSDOS to Model 4 disk using the Model 4 CONV command.

If you have any questions about the programs, call Keith Johnson at 603-924-9471. Yearly subscriptions to Load 80 are \$199.97 for disk, or \$99.97 for cassette. Individual loaders are available on disk for \$21.47 or on cassette for \$11.47, including postage. To place a subscription order, or to ask questions about your subscription, please call us toll free at 1-800-343-0728 between 9 a.m. and 5 p.m. Or, you can write to Load 80, 80 Pine St., Peterborough, NH 03458.

Directory

Endgame

Article: Fight Simulator (p. 40).
Systems: Models I and III, 32K RAM, one disk drive.
Language: Disk Basic.

A combat simulation that demonstrates simulation programming techniques.
Cassette filespec: B.
Disk filespec: ENDGAME/BAS.

Prompter

Article: Restricted Entry (p. 70).
System: Models I, III, and 4, 32K RAM, one disk drive.
Language: Disk Basic.

Predefine acceptable user input.

Cassette filespec: C.
Disk filespec: PROMPTER/BAS.

Scroll

Article: Stationary Department (p. 74).
System: Model 4, 64K RAM, one disk drive.
Language: Assembly.

Adds scroll protection to Model 4 video display.

Cassette filespec: SCROLL (object code).
Disk filespec: SCROLL/SCR (source code), SCROLL/CMD (object code). Source code requires ALDS editor/assembler.

Fractals

Article: Fractals in Focus (p. 58).
Systems: Models III and 4, 32K RAM, one disk drive, high-resolution board.

Language: BasicG.
High-resolution modification of

Michael van de Panne's fractals program.

Cassette filespec: D.
Disk filespec: FRACTALS/BAS.

BBS

Article: BBS Express (p. 92).
System: Model III, 48K RAM, two disk drives.
Language: Assembly.

Put the finishing touches on your bulletin board system.
Cassette filespec: BBS (source code).
Disk filespec: BBS/SRC (source code). Requires Radio Shack Editor/Assembler.

Extend

Article: The Next Step (p. 100).
System: Model 4, 64K RAM, one disk drive.
Language: Assembly.

Demonstration of an extended command interpreter.

Cassette filespec: EXTEND (object code).

Disk filespec: EXTEND/SRC (source code), EXTEND/CMD (object code). Source code requires ALDS editor/assembler.

Convert

Article: Special to Load 80.
System: Model III, 32K RAM, one disk drive.

Converts Apparatus editor/assembler or Radio Shack Series 1 Editor/Assembler source files to ALDS format.

Cassette filespec: E.
Disk filespec: CONVERT/BAS.

ART DIRECTOR
Beth Krommes
PRODUCTION SUPERVISOR
Dion Owens
PRODUCTION ASSISTANT
George Gardos
AD/GRAFICS PRODUCTION
Gary Ciocci

MANUFACTURING MANAGER
Susan Gross
TYPESETTING MANAGER
Dennis Christensen
FILM PREPARATION MANAGER
Robert M. Villeneuve
DARKROOM MANAGER
Nathaniel Haynes

VICE PRESIDENT/GENERAL MANAGER
Debra Wetherbee
VICE PRESIDENT/FINANCE
Roger Murphy
ASSISTANT GENERAL MANAGER
Matt Smith
ASSISTANT TO VP/FINANCE
Dominique Smith
DIRECTOR OF CIRCULATION
William P. Howard
CIRCULATION MANAGER
Frank Smith
DIRECT AND NEWSSTAND SALES MANAGER
Raino Wierin
1-800-343-0728
DIRECTOR OF CREDIT SALES
AND COLLECTION
William M. Boyer
EXECUTIVE CREATIVE DIRECTOR
Christine Destrempe
PUBLIC RELATIONS
Michele Christian
FOUNDER
Wayne Green

80 Micro is a member of the CW Communications Inc. group, the world's largest publisher of computer-related information. The group publishes 52 computer publications in 19 major countries. Nine million people read one or more of the group's publications each month. Members of the group include: Argentina's Computerworld/Argentina; Australia's Australia Computerworld; Australian Micro Computer Magazine; Australian PC World and Directories; Brazil's DataNews and MicroMundo; China's China Computerworld; Denmark's Computerworld/Denmark and MicroVerden; Finland's Mikro; France's Le Monde Informatique; Golden (Apple) and OPC (IBM); Germany's Computerwoche; Microcomputerworld; Mikrosoft; Software Markt, CW Edition/Seminar; Computer Business and Commodore Magazine; Italy's Computerworld Italia; Japan's Computerworld Japan and Perso ComWorld; Mexico's Computerworld/Mexico and Compumundo; Netherlands' CW Benelux and MicroInfo; Norway's Computerworld Norge and MikroData; Saudi Arabia's Saudi Computerworld; Singapore's The Asian Computerworld; Spain's Computerworld/España and MicroSistemas; Sweden's Computerworld, Mikro-Datoren, and Min Hemdator; the UK's Computer Management and Computer Business Europe; the U.S. Computerworld, HOT CoCo, Infodisc, InfoWorld, MacWorld, Micro Marketworld, PC World, Run, 73 Magazine, and 80 Micro.

Problems with Subscriptions: Send a description of the problem and your current and/or most recent address to: 80 Micro, Subscription Department, P.O. Box 981, Farmingdale, NY 11737.

Problems with Load 80 Circulation: Address correspondence to Load 80, 80 Pine St., Peterborough, NH 03458.

Problems with Advertisers: Send a description of the problem and your current address to: 80 Micro, Rt. 101 & Elm Street, Peterborough, NH 03458, ATTN: Rita B. Rivard, Customer Service Manager. If urgent, call 1-800-441-4403.

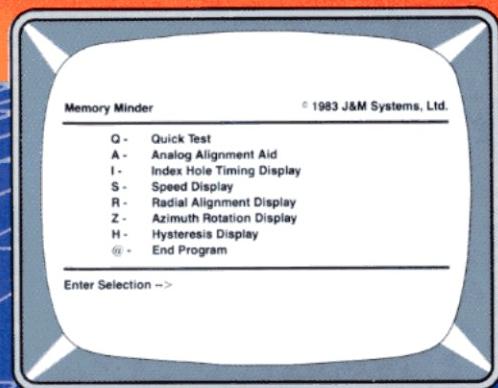
Change of Address: Send old label or copy of old address and new address to: 80 Micro, P.O. Box 981, Farmingdale, NY 11737. Please give eight weeks advance notice.

Microfilm: This publication is available in microform from University Microfilms International. United States address: 300 North Zeeb Road, Dept. P.R., Ann Arbor, MI 48106. Foreign address: 18 Bedford Row, Dept. P.R., London, WC1R4EJ, England.

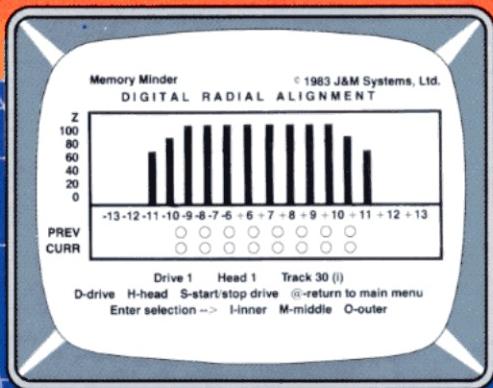
Dealers: Contact Raino Wierin, Retail Sales Manager, 80 Micro, Pine St., Peterborough, NH 03458. (800) 343-0728.

MEMORY MINDER^{T.M.}

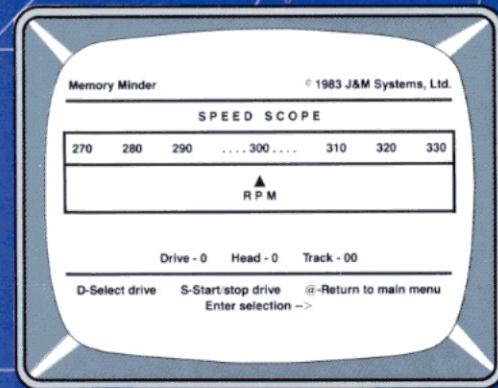
... A UNIQUE APPROACH TO DISK RELIABILITY!



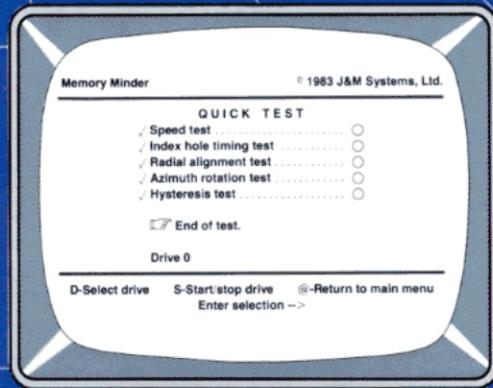
Select any one of seven tests to perform preventive maintenance or to isolate problems. Simple, single-letter commands make MM easy to use! Use MM to align the head, adjust the index hole detector, or adjust the speed.



Use the MM Radial Alignment Test to check the head alignment of your drives. No need for an oscilloscope or other expensive test equipment!



Check the motor speed of your drives. Or, you can even use the Speed Test to adjust the drive speed. No need for any test equipment!



Use the Quick Test to quickly and automatically test five of the most important performance parameters of your drive. Monitor your drives for long term drift. Isolate problems quickly and automatically!

PROTECT YOUR DATA.

Now you can make sure your data is being recorded properly by the use of the revolutionary **Memory Minder**.

The Memory Minder from J & M Systems, tests your disk's performance and calibration without any additional equipment! It measures your disk's performance and displays it on your screen.

This is the most comprehensive disk diagnostic program available for your TRS-80 microcomputer. You can even adjust drive alignment while watching the display!

Spot problems **before** they endanger your data! If you own a disk drive, you **need** the **Memory Minder**!

Price #	
1 - 48 tpi Single Side (Standard)	\$79
2 - 48 tpi Double Side	\$89
3 - 96 tpi Double Side Includes 48 tpi & 96 tpi program diskettes	\$129

Price #	
1 - 48 tpi Single Side Single Density	\$89
TRS-80 Color Computer and TDP-100	\$79
1 - 48 tpi Single Side (Standard)	\$79
2 - 48 tpi Double Side	\$99

MM also available for other models

J & M SYSTEMS IS THE DRIVING FORCE!



J & M SYSTEMS, LTD.

15100-A CENTRAL SE
ALBUQUERQUE, NEW MEXICO 87123
505/292-4182

Spring Cleaning At 80 Micro

Spring is a time for housecleaning, so that's what we're doing. We've added a column, let two old ones go, and added several features.

The new column, premiering this month, is called Spreadsheet Beat. It focuses, as the name implies, on spreadsheets. We'll be giving you templates, utilities, and hints for whatever package you use, including VisiCalc, Multiplan, PerfectCalc, and SuperCalc. The column will apply to you no matter what kind of TRS-80 you own.

We hope this will be a reader's forum, and we invite you to submit your own templates and tips. Turn to p. 106 and see what it's all about.

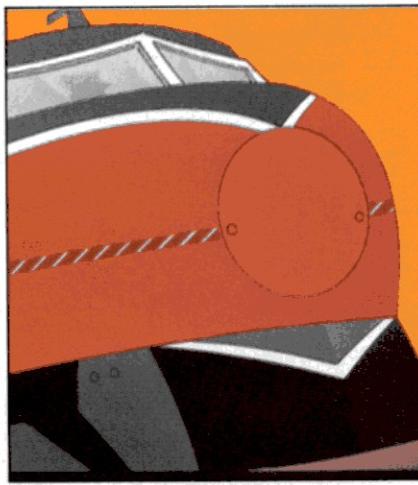
The two columns you'll no longer see are 2000 Plus and BBS Express.

April was the last month for 2000 Plus. We decided to end it for one major reason: The Model 2000 has never caught on with *80 Micro* readers. The number of readers owning Model 2000s has hung at around 3.5 percent since mid-1984, which puts the machine dead last, trailing even the Pocket and Color Computers. We could no longer justify running a column that 97 percent of our readers can't use.

Author John B. Harrell will, however, continue to submit occasional reviews of noteworthy Model 2000 products.

Also finishing its run, with this issue, is BBS Express, our series on writing your own bulletin board system. Authors J. Stewart Schneider and Charles E. Bowen have provided all of the program's modules, and followers of the column now have a fully operational BBS. Those of you who actively call electronic bulletin boards will undoubtedly run into a few installed systems.

Back to new features. In June, you'll see the debut of a monthly collection of capsule reviews called Express Checkout. These quickies have two purposes. First, we can tell you



about new products earlier than we could with full-length reviews. And second, we can give you our impressions of products that might not otherwise make the regular review pages. These include specialized software, MS-DOS software, and new releases of older packages.

In the regular Reviews section, we've started a new feature called Counterpoint. A Counterpoint comprises several minireviews to supplement a feature review. You've already seen one, accompanying the Tandy 1200 review in March. If you missed it, check out the Counterpoint that goes along with this month's DeskMate review (p. 34).

Counterpoints will give you a second, third, and fourth opinion of a major product. Sometimes the Counterpoint authors will agree with the first reviewer; other times we expect that they won't. In either case, you'll get a better idea of how good (or bad) a product really is.

Coming Up

The feature articles are, of course, the bread and butter of *80 Micro*. We've got a well-rounded line-up over the next few months.

June's cover story will be for Model 1000 owners only. We commissioned technical editor Dave Rowell, who wrote the Model 1000 review in April,

to put together a collection of hints, tips, and patches for that system.

For July, we're working on a guide to bulletin board systems for TRS-80 owners. This will not, however, be your ordinary list of phone numbers. We're calling hundreds of boards all across the country, from which we'll select only the dozen or so best. We'll tell you which ones to go to for public domain software, for technical information, and for expert advice from other TRS-80 users. We don't intend to be in the office the day the phone bill comes in, but we think it's worth the expense to let you know about some of the most valuable contacts in the computer world today.

August's feature will be "Getting Back to Basic," in which we'll focus on Basic programming techniques. Of particular interest to Model 4 owners will be a look at the advantages of Model 4 Basic over Model III Basic, including a study of such Model 4 commands as While... Wend and Swap.

We'll highlight September with a piece on transferring files between different microcomputers. What's the best way, for instance, to get a Model 4 data base file over to the Model 1000? How can you convert Model III Basic programs into Model 4 Basic? We'll look at a number of different ways you can do these jobs and others.

Other articles we're working on include a MacPaint work-alike for the III and 4 hi-res boards, a sort generator for the Model III, part II of Andy Levinson's popular "Patch Work," a comparison of word processors for the TRS-80 and Tandy computers, and a round-up of easy hardware upgrades you can do yourself.

By the way, some of these article ideas came from readers through letters, phone calls, and surveys. When we ask for your advice, we mean it. Let us know if there's something you'd particularly like to see. ■

NEW!

OUTLINE SCAMEO

Rofunda

LOMBARDIAN

Pretorian

Nostalgia

INCISED TRAJAN

celtic
Playbill

Calligraphy BACKLITE

Side English

CHAINED

BUCKFILE

CLIMBING



AMERICAN

MOON LITE

Pump

REV BIAN

SHADOW

Elegant
ROMAN

CITY

Mini Cubes

Chancery Medium

B E L L S

Small Boldface
Small Bold Italics

JULY 4

BOOKS

TRIBONIK

Circle 91 on Reader Service card.

These were printed by DOTWRITER on an Epson MX-80.

See What You Can Do With DOTWRITER 4.0!

Now available for the Model 4, too!



DOТWRITER lets you create spectacular, eye-catching letterheads, catalogs, invitations, or even books. It is just what you need to turn your dot-matrix printer into a versatile typesetting machine. And it's available for the Model 4 (yes, in native mode) as well as for the Models I and III.

What is DOTWRITER?

DOТWRITER uses the "bit-image graphics" of your printer to produce the kinds of stunning results shown inside the box. It is a full-function text printing program, so you can inter-mix different character sets, do centering, paragraphs, pagination, magnification, draw horizontal and vertical lines, reversals (white on black), and even print right-justified proportional text.

DOTWRITER includes the printing program, complete documentation, and fourteen useful sets of typefaces (60 to 90 characters in each set). We will include the 160 page Letterset Reference Summary at half-price (\$10.00) with your order.

To use DOTWRITER, just write your text with any popular TRS-80 Word Processor, add the necessary format-

ting commands, and DOTWRITER will do the rest.

35 more disks are available separately. Each has 3-12 complete typefaces (60-95 characters in each set).

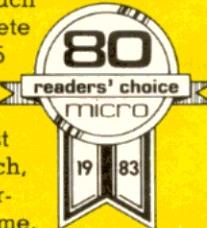
These disks cost less than \$25 each, and may be purchased at any time.

If you want to create your own logos, modify our typefaces, or even design entirely new typefaces, then you will also want to order the "Letterset Design System" (LDS). We offer LDS at half-price when you order it along with DOTWRITER. LDS operates in Model III mode on the Model 4.

Versions are available for Epson MX-80 with Grafrax, MX-100 with Grafrax-Plus, RX-80, FX-80, C. ITOH 8510/1550, Microline 84/92/93; Radio Shack's DMP series 200-2100, CGP-220 & Gemini 10X, 15X. Please specify printer and computer!

Our print samples were done on an Epson. Sizes vary on other printers. Some of the samples shown here are taken from the additional Letterset disks.

Two disk drives and at least 48K of memory are required. LDS is not available in native Model 4 mode.



Send for free print samples!
We've only shown you a few of the 230 DOTWRITER fonts. If you want the best in graphics printing, we suggest you order DOTWRITER today, toll-free.

Please specify printer and computer when ordering.

DOTWRITER	
(Models I, III)	\$79.95
DOTWRITER (Model 4)	99.95
Letterset Design System	39.95
Special: DOTWRITER and LDS	99.95
Additional Letterset disks (4-12 per disk)	24.95
Letterset Reference Summary	20.00

**ORDER NOW, TOLL-FREE
(800) 824-7888, oper. 422**

PROSOFT

Dept. C, Box 560, No. Hollywood, CA 91603
(818) 764-3131 Information and Same-Day Processing

TERMS: VISA, MC, checks, COD. Please add \$3.00 shipping in U.S. or Canada, \$15.00 overseas, sales tax in Ca. Most orders filled within one day.

The Premier Word Processor for Your TRS-80 Model I, III, or 4

F B O S T
Box 540
North Hollywood, CA
(818) 784-3737

Mr. Roger Lewis
Soft Media, Inc.
1000 N. Hillcrest Rd.
Los Angeles, CA 90021

Dear Mr. Lewis:

We received your last shipment right away. We would like to re-order several items, and we would like you to also add some new items. Please add them by 1/10, or on your earliest convenience.

Item	Q'ty
555-01-1/2 Dodekats	1,000
555-02 1/4-1/2 Dodekats	2,000
555-03 1/4 Dodekats	100
555-04 Ribbons	10
555-05 1/4 Dodekats	10
555-06 1/2 Dodekats	10
250 foot hand paper	

I think I got the costs right, but if there is a mistake to me. As always, my thanks for your prompt service.

ADVANCED FORTAN
FONTS/CONT.
Page 3

PRINTING FONTS/CONT.

-PRT and FN Control Words

ALPHATE can print alphabets in a variety of ways. It can print one character at the bottom of each column, at the top of a chapter, or at the beginning of a page in any way. Footnote references appear in the margin of the page, and the number of the page is printed at the end of the way. Footnotes print at the bottom of the page.

ALPHATE, with one control word, can print any kind of nothing, special. For example, "PRT" can print one page to the screen. You can also print characters, numbers, and other materials for anything else you want to print. You can also print superscripts if your printer has that capability, or punctuation characters.

Before a document is used, the footnote feature can be turned off by this control words:

!PRT

That stands for "print脚本" and if you don't type it, the system will assume that defaults will be used, and the system will print the document with the parameters used in the system. When !PRT is encountered, the current page layout settings are discarded and the new page layout settings that will be used to print the document.

... They do not have to be the same, generally accepted as standard, but the guidelines to follow are Perrin's *Fortran 77 Guide and Reference Manual* (Prentice-Hall, Inc., Englewood Cliffs, New Jersey) and *Fortran and Company*, (Chicago, Illinois).

print all footnotes, regardless of where they are located, in the margin, anywhere, or line them up in a column which can be carried to the place the PRT was after the basic command of your program.

Each actual footnote will be bracketed by this control words:

!FN [FN] (the start)
!FN END (the end)

The footnote should appear on screen lines of its own, not on the same line as the text. The footnote does not cause a break in the text, so the words of text preceding and following the footnote will be printed one after the other with only a footnote reference between them and the footnote number added between them.

SPECIFYING FONTS/FORMATS -- FF, Central Fortran

Before getting into this, a quotation from Perrin is in order:

Any description of the form of footnotes makes them seem harder than they really are.

The user may wonder what he means, because the simple answer is that footnotes are likely to be needed whenever you have to derive formats of data from the control words that are available for the purposes.

2. Ibid. p. 365.

We are proud to offer you the one Word Processor that will satisfy all your writing needs: ALLWRITE. It sets new standards for text editing and printing, and will give new life to your TRS-80. Let us tell you why...

In an attempt to push the public into expensive 16-bit computers, many manufacturers have been saying that the TRS-80 is obsolete. The truth is that the software, not the hardware, makes the difference. And the best word processor of all is now available only on the humble TRS-80, not on those expensive 16-bit machines!

ALLWRITE is based on the proven methods that made NEWSCRIPT the most popular independently produced TRS-80 word processor, but it also has the speed and new features our customers have asked us for. ALLWRITE will save you time and let you produce the highest-quality, most professional-looking letters, term papers, and reports available on a micro-computer.

Allwrite Can Save You Time!

Reads a 25,000 character file (10 printed pages) from disk in SIX SECONDS...does a global search-and-replace in FOUR SECONDS...outruns even the fastest popular micro-printer.

ALLWRITE'S Screen Handling Makes Word Processing Easier Than Ever

Change text width at any time; wide lines shift left and right as you type. ALLWRITE preserves double-blanks between sentences, uses the entire screen for text, and displays a complete Status Screen at the touch of a key. Scroll by line, partial screen, full screen, to top or end of file, or to any marked point. Move cursor by character, word, tab, line, or screen.

You can set and change on-screen tabs and store them on disk. The print-time tabbing features are incredibly versatile: they allow left, right, and centered tabs, and even line up your decimal points.

ALLWRITE shows you where you forgot to turn off underlining, boldface, italics, or double-width. Special on-screen Preview feature shows page breaks and page layouts...including underlining and boldface...without annoying blinking or screen flicker. In "Summary" mode, ALLWRITE quickly flags formatting errors without

These were printed by ALLWRITE
shown 20% actual size.

wasting time printing all the text. These standard features make document preparation faster and easier than ever!

State-Of-The-Art File Handling

There is no upper-limit on document size with ALLWRITE, because it chains files backwards as well as forwards, even across diskettes. Switch from one chained file to another in less than six seconds by pressing two keys. Select portions of other files for inclusion at print time...great for stock paragraphs.

ALLWRITE salvages text from bad disks! If a sector goes bad, you won't lose the entire file, because it will skip bad sectors, read the rest of the file,

**TAKES FULL ADVANTAGE OF YOUR
MODEL 4.**

The model 4 version of ALLWRITE uses the entire 80-by-24 screen. On a 64K machine, you can edit over 34,000 characters of text. On a 128K machine, you can edit **THREE FILES AT THE SAME TIME!** The second and third files can be over 32,600 characters each, for a total of almost 100,000 characters of text in memory.

and then show you where the lost text belongs. This advanced error recovery turns a disaster into a feeling of profound relief.

User-Definable Soft Keys Reduce Typing Time

You can store 22 phrases or commands at a time into "soft-keys," then press just two keys to retrieve them. This makes frequently-used phrases and formatting controls a snap to use. You can store these definitions on disk and build a library of hundreds of pre-programmed keys to fit every one of your applications.

Our specially-designed templates fit right on your keyboard to let you see your settings at all times. Each template is also a Reference ("Cue") Card, so it is always right in front of you when you need it, without using up valuable screen space.

ALLWRITE Is Easy To Learn

ALLWRITE's commands and control keys are easy to remember because they use the first letters of common English words: 'CE' stands for 'Center,' 'Search' and 'Replace' do just that, and so forth. The on-line HELP menu offers over fifty screens of topics.

NEWSRIPT's documentation was acclaimed in every review, and ALLWRITE's 350-page book is even better. Portions of it are designed for beginners, with every feature clearly explained in step-by-step tutorial style. Since you won't always be a beginner, other parts of the book offer advanced topics. There is a cross-reference summary chapter, a 14-page comprehensive index, and a detailed Table of Contents. We've been developing computer programs and manuals for over 20 years, and understand the importance of good documentation.

To make installation easy, we include Tiny DOSPLUS for the Models I and III, and special, pre-tailored versions of both TRSDOS 6.2 and DOSPLUS IV for the Model 4, all at no extra charge. The Model I and III versions work equally well with all major DOS's.

PROSOFT'S On-Going Customer Support

Perhaps the best reason of all for having ALLWRITE is the continuing support we offer you: friendly, expert, direct support that is unsurpassed in the micro-computer industry. There is no time limit to our support: if you are our customer and you need help, just call or write. We give free updates for 90 days, and charge little or nothing for minor updates thereafter.

Customer Comments

"This is the best software package I have ever received...superb, easy to use, fast, and has more features than the business word-processor at the office." (E.R.L.)

"ALLWRITE is a professional system that sets a new standard in word processing. It's powerful and easy to learn and use."

80 MICRO, Nov., 1984

"Your company and products have to be one of the strongest factors I can think of for keeping me with the TRS-80!" (J.R.H.)

"NEWSRIPT is the Cadillac of word processors. ALLWRITE is the Mercedes Benz!!" (B.E.)

"...a very readable manual." (D.S.)

BENEFITS OF OWNING ★ ★ ALLWRITE ★ ★

If Word Processing is important to you, PROSOFT's ALLWRITE is the best choice you can make. The clean, professional appearance it adds to your letters and reports will make an excellent impression on people. We will be happy to send you free print samples so that you can see for yourself how good ALLWRITE will make you look.

You probably know that quality word processors for CP/M and the IBM-PC sell for \$300-500, and they don't have ALLWRITE's capabilities or speed...or PROSOFT's proven, on-going support. Now, for a fraction of the cost of a new computer, you can have the most complete word processor of all. And you won't have the headaches of starting all over again with a new, different computer.

Note to college students: with its Footnote, Table of Contents and Index features, ALLWRITE is ideal for your reports and Term papers.

Circle 30 on Reader Service card.

HUNDREDS OF USEFUL CAPABILITIES

ALLWRITE comes with just about every useful word processing feature...standard. Here are some highlights: excellent right-justified proportional printing on most printers having that ability; powerful Form Letter and Mailing Label preparation; instant counts of words, characters, lines, changes; block Move, Copy, Delete, Putfile, Getfile, and List; delete by character, word, line, sentence, paragraph, or block; insert and one-key insert; great RS-232 printer support; accepts all 256 ASCII codes from keyboard; intermix pitches on same line (printer-dependent); 1.5 line spacing, 6, 7, 8, 12 lines per inch (printer-dependent); does multiple-columns on all printers; perfect alignment of hanging indents; variables, logic statements, conditional printing; wildcard Directories; integrated with Electric Webster and DOTWRITER for Models I, III, and 4 (these are sold separately); "Legal" line numbering; paragraph, list, and figure numbering; supports most popular printers (all "printer drivers" included); compatible with high-memory drivers; fully explains all DOS and ALLWRITE error messages; wildcard search-replace; tabs, search-replace, other settings remembered across files; word reversal; up to nine levels of boldface; flexible page titles; footnotes at bottom of page or end of document; Table of Contents and Index generation; and PROSOFT's unmatched text formatting and printing capabilities.

Attention NEWSRIPT Owners

You can trade in your copy of NEWSRIPT at very substantial savings. Please call our technical line for details.

How To Order

You can order by phone or mail. For quickest delivery, call our Technical Support line. Please specify your TRS-80 model (I, III, or 4, 48K, at least two disk drives), and your printer(s). Our price includes normal shipping in the U.S. and Canada. The sooner you order, the sooner you will begin to benefit from the ALLWRITE! Word Processor.

~~\$249.95~~ ~~\$199.95~~

ORDER NOW, TOLL-FREE

(800) 824-7888, oper. 422

PROSOFT[®]

Box 560, No. Hollywood, CA 91603

(818) 764-3131 for Technical Information and Same-Day Processing.

Terms: VISA, MasterCard, checks, C.O.D. California residents please add sales tax.
Most orders filled within one day.

2000 Update

In his November 1984 column, John Harrell (2000 Plus, p. 174) makes it clear that he's not satisfied with our conversion utility, Convert 2000. While that's his right as a reviewer, we feel that his negative comments aren't justified. For example, Harrell complains that Convert 2000 is slow without regard to the reasons behind this lack of speed; our utility searches for key words one line at a time, rather than checking for token codes.

Harrell also reacts negatively when he discovers that the program won't change PRINT@ statements with variables in the arguments. The documentation clearly states that it's not always possible to convert all statements to their exact equivalents. Convert 2000 flags down any statement that's not directly convertible and offers suggestions as to how the programmer can work around the problem. Convert 2000 is one of the most flexible conversion programs available and has saved us valuable time when transferring our Model I files over to the Model 2000.

*Dave Dischert and Dan Keen
Software Horizons
Cape May, NJ*

Positive Thinking

I'll grant that the heyday of TRS-80 market mania has peaked, yet let's not overlook the beneficial effects of a dwindling marketplace. For example, many of the less reputable dealers are now extinct while quality-conscious companies continue to support their winning programs and develop new and exciting products as well. These dedicated people should be praised in the highest terms as they represent computing at its best. Hang on to your Radio Shack hackbox; the sun hasn't set on the TRS-80 market yet.

*Warren R. Morrisett
Bronx, NY*



QED Reports

In Pulse Train (January 1985, p. 24), Bradford N. Dixon refers to recent Quality Education Data (QED) reports on computer to student ratios in large school districts. Perhaps you'd like to hear from some of the less populated areas.

A neighboring elementary district has a current ratio of 12 students to 1 computer. We have a ratio of 16:1 in our kindergarten to eighth grade elementary school and 7:1 in our high school. The Office of Public Instruction for the state of Montana gives a statewide ratio of 33:1 for their most recent statistic.

Keep reading these reports and passing on the statistics. I enjoy your column as well as the rest of the magazine.

*Gary L. Webber
Fromberg, MT*

State of the Art

There seems to be a lot of publicity lately on the new Tandy Model 1000. With this new machine, we're told, Radio Shack has finally rectified the things it did wrong with earlier TRS-80s. But in all the enumerations of Tandy's "new look," a major factor in its earlier problems has been overlooked.

The missing factor is quality control and service. The original TRS-80

didn't become known as a "trash-80" just from poor marketing, as one is led to believe from recent editorials on this issue. Every reader of 80 Micro should be familiar with the problems plaguing the Model I's Expansion Interface connectors that could have been avoided if Radio Shack gold-plated them in the first place.

This summer, I decided to upgrade to the Model 4 for a number of reasons, not the least of which was my impression that Radio Shack had improved its quality control. Wrong. It took three trips to the Fort Worth service center to get my machine fixed, and even then they managed to lose my packing case.

What has all this got to do with the Model 1000? Just this: It's built by the same company that built my TRS-80s, and it'll be serviced by the same people who've fouled up practically every time I've had contact with them. Unless Radio Shack is going to make a serious effort to upgrade its standards of manufacture and service, all the marketing savvy in the world won't win back the market share it once possessed in the microcomputer world.

*Gary W. Shanafelt
Abilene, TX*

Something Different

After buying a TRS-80 Model 4 computer, I realized the machine had an intermittent rebooting problem, resulting in lost data. The problem continued even after servicing. I wrote to Radio Shack who, to my delight and surprise, replaced the computer.

I don't know how often this happens, but it's nice to know that this kind of concern is available from both Radio Shack and its dealers.

*Marvin Weinberg
New York, NY*

Send Correspondence to Input, c/o 80 Micro, 80 Pine St., Peterborough, NH 03458.

**THE FRIENDLIES,
MOST POWERFUL AND
MOST COMPLETE DOS
ever to operate a Model 4:**

DOSPLUS 4

Get it TODAY from ALPHA!

~~\$169⁹⁵~~

**Special
this month!**

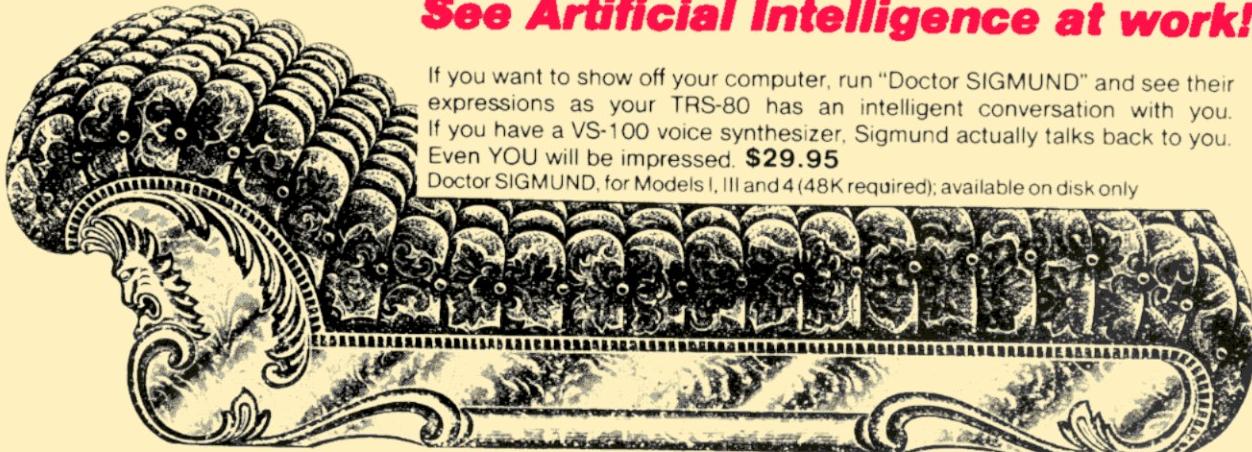
\$109^{00*}

15 day money back guarantee. **1-800-221-0916**

*ALPHA Products guarantees the lowest price. We will beat or match any advertised price.

"Doctor SIGMUND" will amaze you!

See Artificial Intelligence at work!



Circle 17 on Reader Service card.

If you want to show off your computer, run "Doctor SIGMUND" and see their expressions as your TRS-80 has an intelligent conversation with you. If you have a VS-100 voice synthesizer, Sigmund actually talks back to you. Even YOU will be impressed. **\$29.95**
Doctor SIGMUND, for Models I, III and 4 (48K required); available on disk only

 **ALPHA** *Products*
79-04 Jamaica Ave., Woodhaven, NY 11421 (718) 296-5916

Toll Free Order Line

800-221-0916

Orders Only. NY & info call

(718) 296-5916

Hours: 9-5 Eastern Standard Time

Add \$3.00 per order for shipping/handling.

We accept Visa, Mastercard, Checks, M.O.

C.O.D. Add \$3.00 extra.

N.Y. Residents add sales tax.

Overseas: F.P.O. A.P.O. Add 10%.

Dealer discounts available.

Send questions or problems dealing with any area of Tandy/Radio Shack microcomputing to Feedback Loop, 80 Micro, 80 Pine St., Peterborough, NH 03458.

Q: Our religious order uses a Model III and a Model 4 with Scripsit and LeScript and a Daisy Wheel II printer. I've noticed a cross character in the lowercase section of the daisy wheel. I've tried, but can't come up with the right combination of keys to print this character. Could you help us? (*Rt. Rev. George E. Boynton, Seattle, WA*)

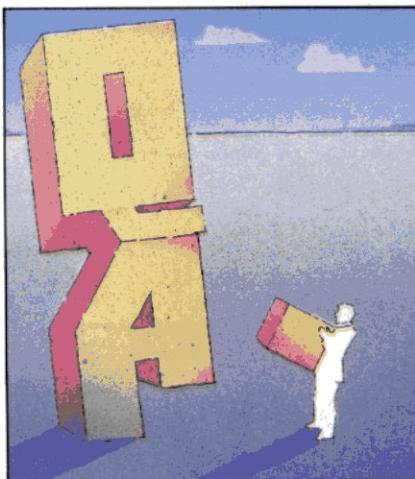
A: The cross's character code is 168. If you check your LeScript documentation, you'll find special key combinations to embed this character in your printouts. On the screen display, though, you'll see one of the TRS-80 graphics characters, not the cross.

Unfortunately, Scripsit doesn't support characters that you can't type in from the keyboard.

Q: Do you know where I can get daisy wheels for my Radio Shack DWP-210 printer that offer a wide variety of typefaces and that are compatible with SuperScripsit? (*Daniel E. Roth, Grass Valley, CA*)

A: Your problem is finding printwheels for the DWP-210, not compatibility with SuperScripsit. As yet, I haven't been able to locate a third-party source of printwheels for any Radio Shack daisy-wheel printers. I keep hoping that one of the printwheel manufacturers will get on the ball and tackle the Radio Shack market. As soon as I find one, I'll mention it in this column.

Q: I have a Model 4 with dual disk drives and a null modem with an RS-232 cable connected to a



Model 12. My problem is converting programs from the Model 12 over to disk storage on the Model 4.

So far I've been able to get the Model 4 into the communication mode using the COMM program, but I can't get the Model 12 to send or receive files. Can you help? (*Jonathan C. Hall, Greenfield, MA*)

A: First, can you get the computers to transmit anything to each other? If you can't, your problem might be the hardware connection between the machines or your communications software. COMM should give you everything you need for the Model 4. On the Model 12, make sure you're using the correct RS-232 port (that is, that you have the software sending the data to the RS-232 port connected to your Model 4).

Once you're sure of your hardware connections, concentrate on software. Set both computers to the same parameters. Set baud rate to 300 at first, word length to 7; and stop bits to 1. Parity can be even, odd, or none, just as long as both computers use the same parity, and have the same protocol enabled, usually XON/XOFF.

If some characters transmit correctly, but others don't, change your parity, word length, or stop bits. If the baud rate is wrong, you'll get garbage characters on both ends. Keep experi-

menting with the parameters until you get reliable communication between the two computers.

Now start increasing the baud rate of both computers (no reason to waste time at slower rates). However, be warned that 19,200 baud rarely works out.

Once you're satisfied with these operations, start on your programs. You must send Basic programs in ASCII format (saved as FILE NAME,A). Since ASCII expands program lines, you might get a direct statement error message when you try to reload the file, indicating that a line is too long. If so, you'll have to break down the offending line.

Open a storage file on the destination computer and send the ASCII file to it. Then exit the telecommunications program and load the file into Basic. It should load properly. If it does, all you have to do is modify the program for the new computer and get it to work. If you want to send a machine-language program, things really get complicated. First, both computers must use the same central processing unit (CPU). Second, you have to change all the input and output routines to match the new computer's input and output locations. Third, you need special software to transmit and receive these programs, and you must set your RS-232 word size to 8 bits, no parity.

Q: I bought one of the newer versions of the Model 4, which has clustered arrow keys and a green CRT. In Model III mode, the screen has good brightness, but in Model 4 mode, the screen is dimmer by half, even with the brightness control on full.

When I wrote to Radio Shack in Fort Worth, they told me they were aware of the problem, but had no authorized solution. I've installed one of Langley-St. Clair's green CRTs in a friend's Model 4, and Langley's in-

Check these features:

- Talker 2.0 and Talker 4.0 software:**
- Unlimited translation of English text to clear speech.
- Powerful video or keyboard echo can be switched on or off at any time.
- Can be used in BASIC with 2 new commands: PRINT* "I can talk" speaks any expression. PRINT! "Hello" speaks and prints on screen.
- Reads numbers up to 999 trillion.
- Speaks many abbreviations, such as Mrs., Mr., lb., oz., Co., etc.
- Walks the dog.
- Many control codes to tailor the system to your wishes. (Pitch, speed, etc.)
- Only 6 1/4 long.
- Talker relocates itself into available high memory. Compatible with any DOS (not CPM).

The VS-100 hardware:

- Same performance as very expensive units.
- Super efficient: About 50 bytes per sentence.
- Handsome speaker module included.
- Detailed 48 page manual.
- Ready to plug in and talk right away.
- Uses the famous Votrax SC-01 with 4 pitch levels and automatic inflection.
- Built in audio amplifier with volume control.

See the detailed review in 80-Micro December 1984.



The VS-100: You've never had so much fun with your TRS-80

"The VS-100 and Talker 2.0 are a major accomplishment for such a low price"

"The VS-100 does everything that Alpha claims, and does it surprisingly well."

"It would be hard to find more value and fun."



80-Micro (December 1984).

**You must agree or
your money back !**

Circle 17 on Reader Service card.

ALPHA Products
(718) 296-5916

79-04 Jamaica Ave., Woodhaven, NY 11421

SPEECH
fun simple powerful

with the vs-100 voice synthesizer



The VS-100 system. (Model I shown)

\$69.95

Includes:
- VS-100 synthesizer
- Speaker
- Power supply
- Manual

Specify Model I, III, 4 or 4P.

Model 4P needs short 50 pin extension cable 14.95

TEXT-TO-SPEECH SOFTWARE

- Talker 2.0** for Models I and III
On disk only..... 29.95
- Talker 4.0** for Model 4. Includes Talker 2.0 for Model III mode. On disk only..... 39.95
- Text-to-Speech** for tape users 19.95

Small Print: ● Model I: unit plugs into keyboard or expansion interface 40 pin bus. ● Model III, 4, 4P: unit plugs into 50-pin I/O bus. Model III VS-100 works with Model III, 4, 4P. Use our "Y-cables" (see next page) if your bus is already used.

Toll Free Order Line

800-221-0916

Orders Only. NY & Info call

(718) 296-5916

Hours: 9-5 Eastern Standard Time

Add \$3.00 per order for shipping/handling.
We accept Visa, Mastercard, Checks, M.O.
C.O.D.: Add \$3.00 extra.
N.Y. Residents add sales tax.
Overseas, FPO, APO: Add 10%
Dealer discounts available.



The PRODUCER
Winner of
★★★★★
FIVE STARS
in 80 MICRO Magazine's
Software Review

January 1985
The PRODUCER gained
this perfect rating
based on
Ease of Use
Quality Documentation
Freedom from Bugs
Ability to Do the Job.

**You can quickly create programs
to manage such things as
mail lists, personnel records,
inventory control, catalogs,
loan calculations, schedules,
personal finances.
The only limit
is your imagination!**

**THE PRODUCER
CAN SAVE YOU MONEY!** Why buy expensive data base programs that never quite do what you want. The PRODUCER can write all your data storage and retrieval programs for you -- quickly, easily, and to your exact specifications. Investing in The PRODUCER is money saved over and over again.

**THE PRODUCER
CAN SAVE YOU FRUSTRATION!** No more frustrating dependence on inadequate software that someone else packaged for mass consumer use. With The PRODUCER you can design and write custom software to meet your exact needs. You can become a programmer even though you have no previous programming experience. The PRODUCER helps you plan what you want and then writes all the code for you at the push of a button.

**THE PRODUCER
CAN SAVE YOU TIME!** What formerly was impossible for novices, can now be done with ease. What formerly took professional programmers days and weeks, can now be accomplished in minutes. After a few hours going through The PRODUCER's easy to follow Tutorial, you will have an incredible time saving tool at your fingertips. Most PRODUCER users testify that they can create complete programs from start to finish in as little as fifteen minutes. You will soon be wondering how you could ever have done without The PRODUCER.



The PRODUCER

Professional Program Writer

**Beginners can program with no experience necessary.
Professional programmers can save days and weeks of time.**

WITH THE PRODUCER YOU CAN ENJOY THESE OUTSTANDING FEATURES

- **An easy-to follow tutorial** that takes you step by step through The PRODUCER process. It's all you need to get started and even lets you create an actual program as you learn.
- **The best screen generator available anywhere.** You have full screen control including graphics. You can add, insert, delete and move blocks of text on screen or between screens.
- **Full support for all math functions,** including subtotals and global calculations.
- **A B-Tree file structure,** that gives extremely fast access to data, allows global search and replace, data entry by batch mode and automatic file rebuilding.
- **The Freeform Report Generator** provides amazing versatility to design text placement, interfield calculations and formats. You can even print reports on your standard forms.
- **Full editing control at all times.** You can easily edit and refine at any point, including the finished program, without having to start over. That's a feature not found on other products. The screen generator lets you experiment, rearrange, "cut and paste" between trial screens and change your mind any time you wish.
- **A fully indexed reference manual** of over 200 pages gives you complete technical support at your finger tips. You may never need to read it, but it is all there just in case.
- **Outstanding technical support.** Your PRODUCER package comes with four free issues of The PRODUCER quarterly newsletter. And should you ever need direct technical assistance, you may call a Producer Software technician for free counsel and trouble shooting.
- **No payment of royalties.** That's right. Provided you give proper credit, you may sell PRODUCER generated programs without paying royalties. Finished programs do not need the original PRODUCER system disk to run, so they are easy to duplicate and distribute. The PRODUCER can put you into the programming business for friends and associates.



"The longer I used The Producer, the more impressed I was. After only one month, it had found a place among my most often used software."

Hardin Brothers
Reviewer, 80 Micro

"The Producer is an excellent package, capable of doing everything I wanted it to."

Hardin Brothers
Reviewer, 80 Micro

"The Producer will allow you to develop a data base program in a couple of hours that would take months to program and debug by hand."

Charles Knight
Reviewer, Basic Computing

"The Producer is certainly one of the better buys in today's software marketplace."

Charles Knight
Reviewer, Basic Computing



TRS-80 Models I, III, IV, 4-P

Requires 48K, 2 Disk Drives

\$199.95

1-800-433-5355

(TX) 214-456-0074

Ask about DATA SHUFFLER
All purpose Sort/Merge program.

We accept money orders, cashier's checks, VISA, Master Card, and American Express. Circle 76 on Reader Service card.

FEEDBACK LOOP

structions mention that the internal brightness control is labeled VR303 and has a resistor labeled VR320 in series with it. They say soldering a 1 mega-ohm resistor in parallel with VR320 should correct the dimness. Do you think this solution will work on my CRT? Do you have any other suggestions? (W.T., Fostoria, OH)

A: First, check to see if the catalog number (not the serial number) on the bottom of your computer has the letter "A" after it. If the A is missing, you have an old version of the Model 4 with a new keyboard and Radio Shack does have a fix. It involves cutting an integrated circuit (IC) pin on the logic board and jumpering it to another IC. If an A follows your catalog number, this fix won't work.

Langley-St. Clair's solution modifies the contrast control in the Model 4's video board, and should work on your Model 4 if it has a VR320 resistor.

If you have a new Model 4, without a VR320 on the video board, I'm afraid you're out of luck.

The difference in brightness has to do with the area the monitor's electron beam must cover each second and how often it covers this area. The Model 4-mode screen is about 40 percent larger, decreasing the amount of time the beam stays on any one pixel. In fact, on my Lobo Max-80, the difference is such that I can't use certain DOSes in 80-column mode; it rolls continuously. When I stabilize it for 80-column, it's unstable in 64-column mode.

Q: A Japanese exchange student in my computer operations class must compose a letter on a word processor to fulfill the class requirements. Her family at home doesn't read or speak English.

Do you know of a patch to disk Scripsit 1.0 or 3.2 that lets you use the Japanese Kana alphabet in ROM? Failing that, does anyone know of a word processing program that does? We use Model III computers. (James Patterson, Fremont High School, Fremont, MI)

A: I don't know of any word processors that do what you want. Can anyone else help? Unfortunately,

finding a word processor that uses the Kata Kana character set is only half the battle; you also need a printer that can print the characters.

Q: Following a suggestion in your column, I wrote to Microhatch about the possibility of installing their BIGMEM Model I upgrade on my PMC 81. Microhatch said the upgrade should work if my PMC shared certain hardware features with the Model I. However, not being much of a hardware hacker, I'm still not sure it's feasible to install BIGMEM. Can you advise me? (Dr. L. Piacenza, Republic of Transkei, Southern Africa)

A: I've been unable to track down a PMC hardware manual, so I can't check out the schematics. Has anyone out there installed the Microhatch BIGMEM on a PMC computer?

Q: I have five Radio Shack Level I game cassettes that I'd like to convert to Level II for my Model III. Can you help me? (Jean-Pierre Guggenheim, Bryn Mawr, PA)

A: Radio Shack used to include a conversion cassette with the Level II upgrade. Unfortunately, these tapes are no longer available from Radio Shack's National Parts division, but you might be able to find one through a local Radio Shack store. Or, if a reader has a conversion tape he or she doesn't need, please let me know.

Q: I went to several Radio Shack stores and a Computer Center trying to find out if it's possible to dump Model III/4 graphics to a DMP-200 printer using control keys, or if I need a special program. At three Radio Shack stores, they didn't know what I was talking about. At another store, I was told I needed a special program.

At the Computer Center, they said I could dump graphics by pressing the down-arrow, asterisk, and shift keys on the Model III, or CTRL and the colon on the Model 4. I tried this, but it didn't work. I'm very confused. Can you help me? (Kevin Stuebner, Reading, PA)

A: Sorry, those Model III and 4 screen dump commands work only for ASCII characters. Printing graphics characters requires a printer that duplicates the Radio Shack character set from 32-256, or a printer capable of dot graphics and special software to send your graphics to the printer.

You won't find a printer that duplicates the Model III or 4 graphics characters. Finding driver software for dot-graphic printers is also a problem, since different printers use different encoding methods. Aggravating the problem are differences in printer resolution. Sending data in seven-pin chunks to a nine-pin printhead causes all kinds of problems.

The only way to get special video graphics printed out is to use a screen-dump program matched to your specific printer. Otherwise you must be content with the ASCII routines built in to the Model III and Model 4 DOSes.

Q: My Model III just went kaput. I can't get TRSDOS disks to boot up. The drives turn for a few seconds, then stop. Everything else seems OK. Please help me pinpoint the problem. (Horace A. L'Heureux, Springhill, FL)

A: It sounds as if your disk controller board is out. The best solution is to take your computer to Radio Shack and have them check out the board. The problem could be as simple as a bad capacitor or as complex as an entirely blown board.

Q: In the September 1984 issue (p. 18), you wrote that Tandy's double-density board isn't compatible with most double-density DOSes. Since some of us with the Tandy board wouldn't mind forsaking TRSDOS 2.8 DD for more widely used DOSes, do you know of a modification for the board to make it functionally similar to other doublers? (Gary Munson, San Francisco, CA)

A: The problem is that Radio Shack's board uses a different address scheme. To convert it would require rewiring the board to use standard port locations.

Q: I own a Model III and I have several questions. When I print labels on my Radio Shack Daisy Wheel

LSI RELEASES NEW DATABASE MANAGER!

**"LITTLE BROTHER" NOW AVAILABLE FOR
TRS-80® MODEL 4/4P AND PC-DOS® USERS**

Little Brother is a new data management system from Logical Systems, Inc. Unlike many other data managers, ease of use comes first with Little Brother. Many other systems seem to concentrate on making everyone a programmer first, and a data manager second. Others require the entry of 'hu-mung-ous' command lines to achieve even the simplest of results. With Little Brother, you don't need to program ANYTHING or remember complicated command sequences to manage your data. Even for the most complex data management needs, Little Brother will produce results very quickly, often with just a few keystrokes. This is because EVERY function in Little Brother is menu driven and comes with complete on-line HELP information always at your fingertips.

LSI believes that you should do what you do best (i.e. manage your data), and leave the 'driving' to LSI. They've put all their design and programming expertise into Little Brother so that your data management needs can be satisfied quickly and 'painlessly.' Little Brother will handle almost any data base needs that you may have. Virtually the only limitation is your available disk space.

Of course, you define the layout of your data records. Little Brother will handle up to 65534 records, and each record can contain up to 1024 bytes. Little Brother supports up to 64 different data fields for each record, where each field may be from 1 to 254 bytes long. There are seven different types of data fields available.

These are:

Alpha Only the letters A-Z,(a-z) and <space> may be entered.

Numeric Only digits (0-9), a period and a minus sign may be entered.

Right Justified Same as numeric, except the value will be displayed and printed with 'leading spaces'.

Literal Any ASCII character can be entered.

Dollar Allows entry of 'dollar' values, with up to eight digits allowed to the left of the decimal point.

Float Allows 'floating point' values to be entered, with 8 digits to the left and right of the decimal point.

Calculated Allows calculations to be performed using any 'number' field (i.e. Right Justified, Numeric, Dollar or Float). The calculation is user defined, and may include addition, subtraction, multiplication and division. Calculations are precise up to sixteen significant digits.

Defining a data base with Little Brother is simple. Just enter a descriptive name for each field, the type of field that is (e.g. "D" for Dollar, "L" for Literal, etc.) and the length of



Little Brother — Sophisticated but Simple!

the field. Little Brother even has provisions for defining a "Protected Field", so that the data for that field will not be displayed unless the proper "Password" is entered. Full editing capabilities are available when defining a data base.

After the layout of your data is defined, all you need to do is establish a "screen", and you are ready to begin entering data! Again, you are in total control of how your data will be entered and displayed on the screen. Up to 10 different screens may be used to display your data.

After you have entered information, you may view or edit any record at any time. It is always a quick and easy operation to "Find" information with Little Brother. You can even create an "Index" to your data by sorting the information in any field (except calculated fields), so that your data records can be accessed in either "ascending" or "descending" order. Using an Index will allow you to find any piece of information within a matter of seconds, even if there are tens of thousands of data records in your data base!

Once you have built a data base, you may wish to print the information. Simply define a print format, and Little Brother will print the

records according to your specified format. Up to 10 different print formats may be created. Little Brother can handle almost any kind of print format, so that you can print directory-type listings (complete with headers/footers, date, time, page numbering, totals and sub-totals if desired), mailing labels (in single or multiple across format) and even form letters. As with any data-related operation when using Little Brother, you select what records get printed (according to your specified criteria). Records can be printed in "sorted" order as well, which is great for organizing your report (especially useful for "zip code" zoning).

For 'automating' your processing needs, Little Brother can be run in an 'automatic' mode, without any operator intervention. Frequently used Little Brother procedures (such as selecting, sorting and printing records) can be saved for future use. Entire 'Job streams' may be produced, so that Little Brother operations may be intermixed with literally any DOS function that can be 'Batch Processed'.

Speaking of DOSes, Little Brother is available for either the TRS-80 Model 4/4P under TRSDOS 6.2, or the IBM PC/PC Compatibles under PC/MS-DOS 2.0 and

operates virtually the same on either machine! As a matter of fact, data files created on one machine can be directly ported and used on the other machine (Note: Separate copies of Little Brother are required and the movement of data files from one machine to another is the sole responsibility of the user).

Order L-50-510 for the Model 4/4P and L-86-510 for the IBM-PC.

***NOTE:** Hardware specifications for the Model 4 are: minimum two floppy disk drives and 128K of RAM (Hard disk owners need only have 64K of RAM and one floppy disk drive).

Hardware specifications for the IBM-PC are: two floppy disk drives (or one hard disk and one floppy) and 128K.

Enhance TRSDOS 6.2 BASIC With BEEP

Are you tired of getting "Syntax Error" because you left out the space between "EDIT" and the line number? Remember all those handy editing features in LDOS 5.1 BASIC? (If you don't, keep going 'cause it gets better...) < Down Arrow > to list next program line and all that? Well, now you can have that convenience in TRSDOS 6 BASIC, along with better performance and additional programming aids.

BEEP (BASIC Enhancement and Extension Package) from Logical Systems adds several enhancements to TRSDOS 06.02.00 BASIC. BEEP is designed exclusively to run on the TRS-80 Model 4/4P under this version of TRSDOS 6 (BASIC 01.01.00).

BEEP provides single letter abbreviations for the following commands: AUTO, EDIT, DELETE and LIST. To use the abbreviation, simply enter the first letter of the appropriate command. Plus, when specifying a line number with these abbreviations, no space is required. Example: to edit line 20 of a program, just enter E20.

In addition, BEEP provides "immediate command keys". These are the "period", "comma" and "arrow" keys. These keys will act as "immediate commands" when pressed as the first entry on the BASIC command line.

The immediate functions are:

Key	Function
Comma	Edit the current line
Period	List the current line
Up Arrow	List the previous program line
Down Arrow	List the next program line
Left Arrow	List the first program line
Right Arrow	List the last program line

Other enhancements found in BEEP are "move" a program line to a different "place" in your program, "duplicate" a program line, and high speed program load and save. BEEP will load a 26K BASIC program in under six seconds, and save the same program in eight seconds. Compare this to unenhanced BASIC which takes twenty-five seconds to load the same program, and twenty-eight to save it.

Order L-35-209 at \$49.

DSM4 —

"THE" Disk Virtual Sort For Mod. 4/4P

DSM4 is THE versatile Disk Sort utility for the Model 4 user and programmer. DSM4 is a high speed, disk virtual sorting utility which eliminates the burden of sorting from your applications software development project. DSM4 will create and maintain index files for you. Since the sort is disk virtual, your only limitation is the amount of available disk space, not available memory.

DSM4 can sort almost any type of field in a random access file. The length of each field may be up to 253 bytes. The field types that DSM4 will handle include compressed integer,

single and double precision fields, in addition to ASCII data. Single and double precision numbers may be in the format used by Model 4 Microsoft BASIC, or may be in the 'C' floating point format (as implemented by Manx AZTEC 'C').

With DSM4, disk files can be up to 65,535 logical records, with an LRL of from 1 to 1024 bytes. You may specify up to 24 select fields to determine which records will be included in the sort. Any type of relation (e.g. 'equal to', 'less than or equal to', etc.) may be applied to your selection criteria. In addition, logical operators (AND/OR) may be used. For instance: "sort by zip all people with a last name of either Smith or Jones". Additional fields may also participate in the sort. Example: sort in zip order and alphabetically by name within the same zip.

Sorting may be in either ascending or descending order. DSM4 may be instructed to skip records that match a user specified "deleted record" value. Optionally, a list of these "deleted" records may be written to a separate file. You may also save a "template" of the sort/select specifications to disk to automate the sort. This allows you to set up a sort operation that is transparent to even the non-sophisticated user.

Perhaps the most impressive feature of DSM4 is the speed of the sort operation. Compare these statistics to the sorting method you are currently using: Select, sort and create an index of 1000 records. Selecting and sorting on a name, zip code and two double precision fields (a total of 41 characters in the sort key) will take less than thirty seconds from floppy disk, and under twenty on hard disk.

DSM4 operates under TRSDOS 6.2.0 (not included), and is intended for use with user-developed applications software. Please note that DSM4 creates an index file, as opposed to actually re-ordering the records in the data file (though once an index file is created, re-ordering the records is a simple matter if desired). Order L-35-205 at \$99.

OVERDRIVE — For That "Extra Burst"!

How would you like to squeeze that last extra bit of speed out of your TRS-80 Model 4 or 4P? OVERDRIVE will help you get that extra burst of performance from your 128K Model 4/4P running under TRSDOS 6.2.

OverDrive will perform dynamic track buffering on up to two disk drives. Using a portion of your alternate memory, any time a sector of information is requested from a buffered drive, the entire track will be read into memory. When additional sectors from the same track are requested, the information is transferred from memory instead of accessing the disk drive, a much faster process.

In addition to drive buffering, all non-library system overlays (SYS1 through SYS5 and SYS9 through SYS12) will be placed in alternate memory for very fast access.

Besides the performance increase purely due to memory buffering, there is usually additional improvement because many fewer disk accesses will be required. Even on a hard drive system (with its normally fast access times) there will be noticeable improvement due to the fact that much less time will be spent moving the read/write heads in between file accesses.

Also, with OverDrive resident a (very!) minimum system disk may be used as your system drive to maximize your available disk space. All this uses just 32K of your 64K alternate memory, so you can still use memDISK or the system SPOOLER if desired.

Some typical speed increases:

FED II search of a 28K file		
Without OD	With OD	Increase
47 seconds	8 seconds	490%

Load a 24K BASIC program		
Without OD	With OD	Increase
23 seconds	15 seconds	53%

Very Technical Note: OverDrive's speed increase will be tremendous when running a program that currently just misses the system sector interleave pattern. If you didn't understand that, don't worry as you don't have to understand such things to use OverDrive. Order L-35-220 at \$99.

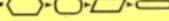
LSI Creates Special Mailing List!

Logical Systems wants you on their mailing list! To this end, they are offering you a spot on the list of users to receive their publications. To take advantage of this offer, simply call 1-800-248-3535 and give your name, address and model of TRS-80 computer. This is a TOLL FREE CALL!

NEW LOW PRICES!

ON HIGH PERFORMANCE TRSDOS® 6 UTILITIES

Only \$29 Each

 Logical Systems Inc. 	The Basic Answer Structured Basic Text Pre-Processor	LS-QFB/COMP High Speed Disk Format and Backup <i>includes</i> Disk/File Byte for Byte Comparison
BSORT/MOD 324 High Speed Machine Language Sort and Program Conversion Aid		

8970 North 55th Street
 P.O. Box 23956
 Milwaukee, WI 53223

FEEDBACK LOOP

Printer II, I don't get an out-of-paper signal. I print 1100-1400 labels at a time, and Tandy now sells labels in 1000-piece strips. Do you know how I can get this signal?

Second, when I turn on my printer, it always prints an ornate symbol, so text starts one print position farther to the right than I want. This happens only when I first power up. Can I correct this?

Third, do you know of a patch to let me use Alpha's joystick with Radio Shack's 13 Ghosts?

Finally, I've found that the chess game, Sargon II, takes a long time to answer with its move in higher skill levels. I've read that people pit these chess programs against each other in tournaments where they time responses, so I know it must be possible to speed up response time. Can you tell me how they do so and if it's feasible for a home player like me? (Arthur Melanson, Audobon, NJ)

A: The older model DWP II printers do have the out-of-paper signal. On page 12 of my owner's manual for that printer, the instructions indicate that pin 12 of the connector transfers that signal to your computer.

My DWP II printer was one of the first sold, way back in 1980. It has a metal rod that activates a pressure switch when the paper runs out. Get out your manual and examine the diagram of the interface signal pin assignments. If it indicates an out-of-paper line, then your printer does use that signal. All you need is the metal rod to attach to it.

However, you can buy labels from most computer supply companies in boxes of 5,000 and 10,000. You can also use scotch tape to join paper from the end of one box to the beginning of another.

I know exactly which symbol your printer prints on system power-up; I've seen it many times. The only way to escape it is to turn the printer on after you power-up the rest of the system. Other than that there's nothing you can do. The power-up sequence is in computer ROM and you can't easily change that.

Since 13 Ghosts is a machine-language program, patching it to use the Alpha joystick is a job best left to expert programmers. You have to fix the

keyboard scan routine to look at the port the joystick uses and react according to the values found there. Can anyone help?

The chess tournaments are open to any and all computer-based chess-playing software, so you get everything from small micros to giant time-sharing systems. Most tournament sponsors heavily modify the microcomputers, usually by replacing the CPU with one running two or three times as fast.

One Model I entry at a tournament three years ago used a Z80A running at 4 MHz, with most of the support chips replaced by much faster versions. Since the Models I and III normally operate at 1.7 MHz, this change alone reduced response time. It also operated with a detached keyboard, since the CPU was in a special refrigerated box for cooling purposes.

Usually, these modifications are well beyond the capabilities of most computer owners. If you're really serious, contact Holmes Engineering at 5175 Greenpine Drive, Murray, UT 84123. They make speed-up boards for the Models I and III.

Q: I've been a TRS-80 user since the earliest days, and now use a Model 4 and a Model 100, as well as two much larger minis. I own many of the major software packages from Radio Shack and a number from other suppliers. In short, I'm hardly a newcomer or a novice when it comes to microcomputing.

I've lost track of the number of times I've read statements and advertising copy in magazines like *80 Micro* to the effect that CP/M "opens the door to thousands of programs," many of which are in the public domain. But now that I've purchased CP/M 3.0, I've had trouble finding specific information about CP/M software.

How does one gain that often-touted access to CP/M software? (Thomas R. W. Longstaff, Waterville, ME)

A: See my answer to Rafael Salgado in the March 1985 column (p. 18) for information about commercial and public-domain CP/M programs. Be aware, though, that Radio Shack's CP/M 3.0 uses a non-standard method of disk storage,

so it can't read CP/M 2.2 data disks in any format. I'm sure someone is working on a conversion utility, but until it becomes available, you'll have great difficulty transferring data between the two formats.

Q: Because my Model I caused interference with my amateur radio station, I bought a used Model III, after being told the III had RFI (radio frequency interference) suppression that would solve the problem. This, however, was far from the truth. The noise around 21 MHz is so bad that I can't hear any stations. The noise seems to be radiated into the antenna directly from the computer.

I have RFI filtering on the radio transceiver. When I remove the antenna from the transceiver, most of the noise abates.

When I opened up the computer, I saw no shield around the processor board. I thought all Model IIIs had this shield. Is this shield available? Will it reduce the RF noise? What other changes or modifications do you recommend to reduce interference? (Howard Eddy, Hermosa Beach, CA)

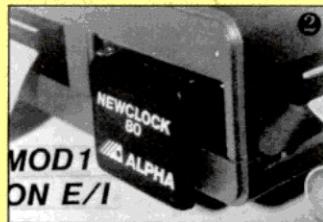
A: Someone sure goofed on your computer: All Model IIIs are supposed to have that RFI shield in position before they leave the production line. You can get the shield at any Radio Shack Computer Center, although you might be able to talk the technician into giving you one since the computer didn't have one when you bought it. The shield will reduce significantly the RFI you notice in the ham shack.

To decrease noise further, you'll have to get your soldering gun out and make sure that the grounding cables on the computer frame and shields are all solidly in place, with clean connections. If you really want to do a job on the computer, spray paint the interior of the Model III case with a metallic paint, then put bolts through the case and ground the bolts to the metal computer frame. When doing this, make sure you don't accidentally short out any connections or leads, and cover all exposed electrical joints with insulation. ■

Terry Kepner is a freelance writer and programmer, and an associate editor for *80 Micro*.

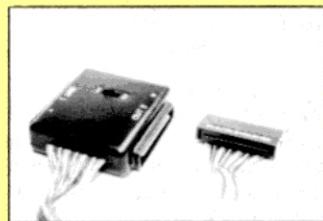
Newclock-80 \$69.95

The right time at the right price! Keep the time and date with quartz accuracy, even when your computer is off. The backup lithium battery (included) will last for over 2 years. Software on tape or disk, please specify. Use "TIMESET" once to set the clock. Use "SETCLK" to set your computer's internal clock (at power up) or use "TSTRING" so that the "TIME\$" function reads the Newclock. Connection: Model I: plugs into the keyboard or expansion interface. Model III: plugs into the 50-pin I/O bus. Compatible with all operating systems.



Printswitch \$59.00

Do you have 2 printers? Get a Printswitch. Stop plugging and unplugging those printer cables. With the Printswitch, you can have 2 printers connected to your computer and you can select either one at the flick of a switch. Works with any printer, plotter, or device that uses the parallel printer port. Simply plug the 14 inch Printswitch cable into your computer, and plug your existing printer cables into the Printswitch. This is the nicest unit on the market. Superior quality board with gold plated edge connectors. For Models I,III, 4 and 4P.



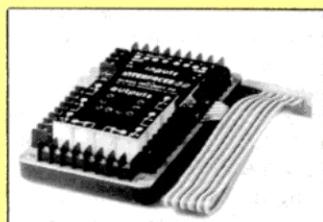
Alpha Joystick \$27.95

When it's time for fun, don't be without your Alpha Joystick. Do you know that most action games are Joystick compatible? Stop pounding on your keyboard and enjoy real arcade control. The joystick can also be used with BASIC programs; simply do J=INP(0) to read the joystick position (8 directions and fire button). Model I: plugs into keyboard or expansion interface. Model III, 4 and 4P: plugs into 50-pin I/O bus. The Alpha Joystick comes fully assembled and tested, ready to plug in and enjoy. (Specify Model I, or Model III.4).



Interfacer-80 \$159.00

Low cost input and output device. The outputs consist of **8 relays** (rated 2 Amp @125V), easily controlled using "OUT" commands. For example, OUT 0.0 turns all the relays off. Eight LED's show the states of the relays. The **8 inputs** are optically isolated, so it's safe and easy to connect external devices (switches, sensors, thermostats, etc.). Simple "INP" commands read the inputs. Connection: Mod I: 40 pin bus. Mod III, 4, 4P: requires 50-pin I/O bus converter (\$39.95), plugs into 50-pin I/O bus. Comes complete with power supply, cable, and detailed manual. (Up to 8 interfacers can be connected to your TRS-80 using our Y- cables).



Analog-80 \$139.00

8 channel 8 bit Analog to Digital converter. Your TRS-80 can read voltages, temperatures, pressures, light levels, etc. • Input range: 0 to 5.1 Volts. • Resolution: 20mV. • Conversion time: 120 microseconds. In BASIC, you can take up to 100 readings per second. • Port address: selectable. Up to 8 Analog-80's can be connected to your TRS-80 for a total of 64 channels! Connection: Model I: 40 pin I/O bus. Model III, 4, 4P: requires 50-pin bus adapter (\$39.95). Comes complete with power supply, cable, and manual.



Special Cables

Disk drive extender cable (8")...C160:\$9.95

Y-Cable for Mod I bus (40 pin): • X2-40...\$29 • X3-40...\$44 • X4...\$59 • X5...\$74

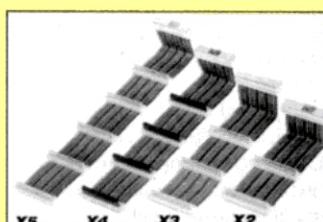
Y-Cable for Mod 3 & 4 bus (50-pin): • X2-50...\$34 • X3-50...\$49 • X4-50...\$64

Disk drive cable (34 pin): • 2-drive...C162:\$32 • 4-drive...C163:\$45

Extension cable, 4 foot: • For printer and drive (34-pin)...C165:\$22

• For Mod I bus (40-pin)...C167:\$24 • For Mod 3 & 4 bus (50-pin)...C169:\$28

Keyboard to E/I (40-pin, 8")...C161:\$21 If this is confusing, send for our Cable Flyer. Our cables are made with high quality gold plated connectors to ensure utmost reliability.



NO RISK

We know that ordering by mail can sometimes be a hassle, but with Alpha, you are fully protected.

1) Our 15 day money back guarantee protects you from disappointment.

2) All our products are tested on a TRS-80 and guaranteed for 90 days (parts & labor)

3) We ship 90% of our orders within 24 hours.

4) We are committed to help you

Green Screen \$12.50

Do your eyes a favor, put on a green screen. Tens of thousands are in use for a good reason: they work. Contrast is enhanced and eye fatigue is greatly reduced. Our green screen is curved; it fits right on the face of the tube. (Fits Models I,II,III,4,12,16)



Circle 17 on Reader Service card.

ALPHA Products
(718) 296-5916

79-04 Jamaica Ave., Woodhaven, NY 11421

Toll Free Order Line

800-221-0916

Orders Only, NY & Info call
(718) 296-5916.

Hours: 9-5 Eastern Standard Time

Add \$3.00 Per Order For Shipping
And Handling. We Accept Visa,
Mastercard, Checks, M.O. C.O.D.
Add Sales Tax. Overseas, FPO
APO: Add 10% Dealer Discounts
Available C.O.D. add \$3.00 extra.

Things Are Tough All Over

Tandyland

"The computer business will continue to be a zoo. Maybe it's just entering the zoo stage." So says John Roach, Tandy Corp.'s chief executive officer.

Roach, coming off another disappointing quarter at Tandy, told the Fort Worth *Star-Telegram* that he expects the market shakeout to end before next year, but he says fewer retailers will be around when it's all over.

Tandy's second-quarter profits in fiscal 1985 dropped 24 percent compared to 1984's second quarter. The drop marks Tandy's third consecutive quarter of earnings declines (see Fig. 1).

Although the profit drop was companywide the reasons for the computer division's profit problems aren't hard to find. Price-cutting and fierce competition have taken their toll on all computer manufacturers. And the cost of developing and introducing four new computers, the Tandy 200, 1000, 1200, and 6000, was bound to eat into profits.

Mark Manson, an analyst with Donaldson, Lufkin, and Jenrette Securities Corp., characterizes 1984 as painful for Tandy, but says their new computers should boost sales. Manson also thinks sales of noncomputer products, especially cellular phones, digital audio equipment, and stereo adapters for television sets, will improve Tandy's profit margin.

In spite of the dim figures, the Tandy 1000 made a strong debut in the marketplace. "For the first 40 days of its lifetime," Roach says, "the 1000 sold more than any other computer we've ever introduced." The sales are an encouraging

edited by Bradford N. Dixon

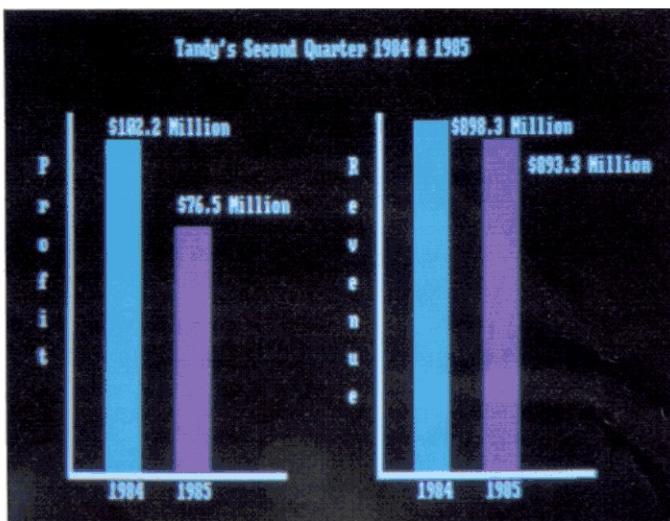


Figure 1. Tandy's quarterly profits.

start to the second half of Tandy's fiscal year. "It's certainly nice to be in a position where we have to worry about making enough [Model 1000s] to satisfy demand," mused Roach.

The microcomputer shakeout of 1984 has spilled over to become the microcomputer shakeout of 1985, but at least who will survive is becoming clearer.

Market watchers expect IBM to keep its spot at the top of the micro heap, and Apple appears likely to maintain its second-place position. After that, the picture gets murky, but it looks as if Compaq, Tandy, and Commodore will hang in there.

Tandy's large distribution chain is a real advantage in the battle for survival. Other companies lose out when they have to develop and maintain sales channels, while Tandy can rely on its well-established retail network.

As for the future, Tandy can expect to face short-term problems that may limit growth, including the overall market slump and declining third-party support for Tandy's older ma-

chines. But, in the long run, the company's size guarantees it a major role in the microcomputer market.

Some analysts suggest that Tandy's profit woes might prompt the company to spin off the computer division as a separate entity, allowing Radio Shack to reemphasize its low-priced electronics business.

However, this seems unlikely. Garland Asher, vice-president in charge of finance, tells *80 Micro* Tandy has never discussed starting a new company to handle computers.

Intensive marketing seems to be the key to Tandy's 1985 game plan. Late in 1984, Radio Shack held a month-long sale on the Tandy 1200, knocking \$1,000 off the \$2,999 sticker price.

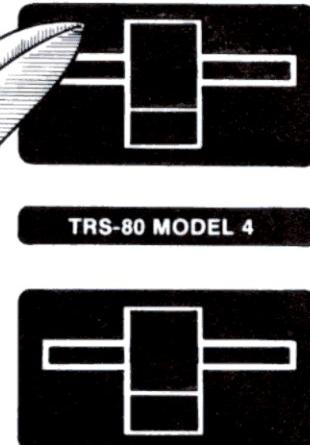
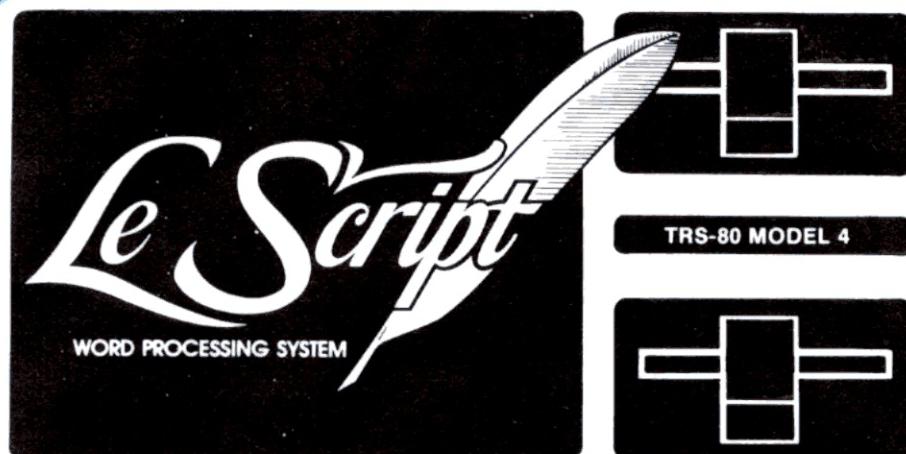
The trend continued into 1985, when Tandy launched what may be the first two-for-one computer sale. Throughout January, you could buy a Tandy 1200 or 2000 for \$2,500 and get an 8K Model 100 free. In the past, when Radio Shack was ready to kill a product, it dropped the price drastically and held special sales, so this gimmick might presage the Model 100's demise.

MicroTrends

The U.S. Department of Commerce has decided to lift export controls on what it considers to be less sophisticated personal computers like the Commodore 64, Apple IIe, and Radio Shack's Model 100.

However, the Commerce Department will continue to regulate IBM's PC/AT and Apple's Macintosh to

TRS-80 AND IBM-PC Word Processing Program



Computers Supported
IBM-PC
IBM-XT
Tandy 1000
Tandy 1200
Tandy 2000
Model 4
Model 2
Model 12
Model 16
Modem 4 CP/M
Model 2 CP/M
Max-80
LNW



"For \$129.95 you'll be
hard-pressed to find a better
overall word processing product."
(LSI JOURNAL, January, 1984)



- 80 x 24 DISPLAY using TRSDOS 6 or any MODEL III DOS.
- Built-in FORM LETTER and MAIL-MERGE capabilities.
- Build-in HELP SCREENS.
- 55 separately programmable MACRO FUNCTION KEYS.
- Performs PROPORTIONAL-SPACE right-margin justification on over 120 different printers (all drivers included FREE).
- Integrates with ELECTRIC WEBSTER spelling checker.
- Keyboard entry and printing of 31 European Characters and special symbols.
- IBM-PC, XT, Tandy-1000, Tandy-1200, Tandy-2000 versions for color or Monochrome, now only \$199.95.
- MODEL 2/12/16 versions now available for TRSDOS 2.0, TRSDOS 4.2 and CP/M.
- LeScript also available to run on TRS-80 MODEL I, MODEL III, LNW-80, LNW-TEAM (80 x 24), Holmes VID-80 (80 x 24), and Lobo MAX-80 (80 x 24). \$199.95

CALL 1-305-259-9397



ANITEK SOFTWARE PRODUCTS
P.O. BOX 361136 □ MELBOURNE, FL 32936

FREE SHIPPING WITHIN THE U.S.; OUTSIDE THE U.S. ADD \$10.00 FOR SHIPPING.
FLORIDA RESIDENTS ADD 5% SALES TAX. ALL ORDERS PREPAID BY CHECK,
MONEY ORDER, CREDIT CARD OR C.O.D. Circle 141 on Reader Service card.

FREE

TRIAL-SIZE DISK OFFER

Fill out and return this coupon to receive a free trial-size copy of the LeScript word processing system - a \$25.00 value.

Name _____

Address _____

City _____ State _____ Zip _____

Telephone _____

My system is:

- Model I/III
- Model 4
- MAX-80
- LNW-TEAM
- Holmes VID-80
- Model II
- CP/M Model 4
- CP/M MAX-80
- CP/M LNW-TEAM
- CP/M VID-80
- TANDY-2000
- IBM PC

Send to: ANITEK • P.O. Box 361136 • Melbourne, FL 32936

keep them from reaching Soviet-bloc countries or China.

The relaxed export restrictions come at a good time for Tandy, now that European Radio Shack stores have merged with outlets that sell Great Britain's Applied Computer Techniques' Apricot computers.

For the industry as a whole, the new export rules could open up a multibillion-dollar market for American computers. But even as the government eased hardware restrictions, it tightened export controls on some software. The Commerce Department must now review programs involving networking, artificial intelligence, computer-aided design and manufacturing, and high-level languages such as ADA before their release for overseas sales.

Where does the average computer buyer get his microcomputer? That's the question Strategic Inc. asked in a recent survey. Of the owners polled, the vast majority, 56 percent, bought their units from retail stores, while 10 percent bought them from mass merchandisers, and 8 percent bought wholesale (see Fig. 2).

Of the remaining sales, 8 percent were bought through original-equipment manufacturers, 4 percent through the mail, 3 percent via direct sales, and 11 percent through other outlets.

If you're writing and selling programs from your home, you might be breaking the law. It seems many communities have established zoning laws to keep doctors and dentists from opening offices in residential neighborhoods. If local authorities decide to get tough, they can apply these laws to home programmers.

That's what happened to Leah O'Connor, a Chicago woman who writes and sells games from her home. The city ordered her to stop operating her business or face a \$100-a-day fine. When the zoning board learned O'Connor had no employees and was violating no other zoning laws, it dropped the threat of a fine.

Chicago's 28-year-old zoning ordinance was written when home microcomputers were still in the realm of science fiction. According to current estimates, home-based computer businesses number in the millions nationwide. Boston and San Francisco have updated their zoning laws to reflect the

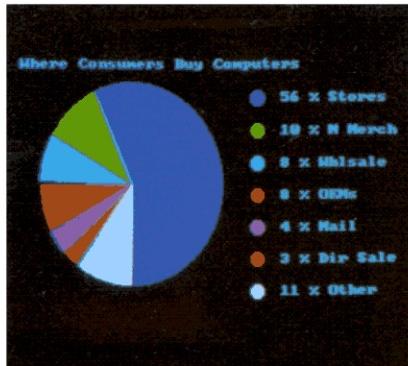


Figure 2. Categories of computer sellers ranked by number of sales.

changing times, but in many communities, the law simply hasn't caught up with reality.

Update

Linda Miller of Radio Shack's Marketing Information department writes to correct an error in the December 1984 Pulse Train story about Tandy's PC Maker program (p. 21). It seems PC Maker does format double-density, double-sided disks.

Miller says the program also works with the Tandy 1000 and 1200 to assure transportability of data between all Tandy MS-DOS computers, and stresses that PC Maker is free to registered Tandy 2000 owners.

And there's more in the mailbag from Fort Worth. Radio Shack's director of market planning, Ed Juge, points out that the graph in February's column (p. 22) illustrates Tandy's warehouse shipments in dollars, not units.

Tandy doesn't release information on the actual number of units shipped or sold, so you have to figure it out roughly, given the dollar amounts of warehouse shipments and knowing the cost of each computer. Juge tells us, "Unit sales were up nicely, but we have to sell a lot more just to stay up with last year."

Hot Items

While some software publishers are turning to exotic copy protection methods to foil pirates, MicroPro International is going in the opposite direction.

Effective Feb. 1, 1985, MicroPro dropped copy protection from its new

word processing programs WordStar 2000 and WordStar 2000 Plus.

The reason? Protection made it harder to install the programs. "We are responding to the customers' need for software that is easy to use," said H. Glen Haney, MicroPro's chief executive officer. But Haney stressed the move "is not a passive invitation to software pirates." MicroPro continues to protect its products; as Haney puts it, "we are pursuing copyright enforcement through other channels."

Software licensing agreements tend to draw flak on the issue of software piracy. According to Fred Volking, director of marketing for Bellsoft Inc. of Bellevue, WA, "Most users don't set out to become software pirates, but the software industry virtually forces them into lives of crime."

Volking observes that most software license agreements require small businesses to buy multiple copies of software at full price, leading many to make illegal copies. Bellsoft is trying a different approach by offering a multiple license agreement: You can make copies for up to 10 computers, saving money if you feel bound by agreements and saving guilt if you don't.

A more radical scheme to protect software comes from Mother Jones' Son's Software Corp. (MJSS). The company puts a "soulcatcher clause" at the end of its licensing agreement, which otherwise sounds pretty traditional.

As they put it, the license doesn't have teeth, it has fangs: "Violate this agreement and our attorneys will see to it that life on this earth, as you know it, is completely ruined. Also, you agree that 30 days after you violate this agreement, ownership of your eternal soul automatically passes to us, and we have the right to negotiate the sale of said soul to the first smoking blood-drenched apparition with fangs (SBDWF) that meets our price. The SBDWF may collect your soul at any time of his/her choosing."

For those not inclined to take this seriously, MJSS appeals to common sense: "Given the remotest chance that some supernatural entity could actually enforce the soulcatcher clause, you'd be a real bozo to take any chances." ■

HOWE SOFTWARE PRODUCT GUIDE

Circle 175 on Reader Service card

SYSTEM DIAGNOSTIC

Is your computer working correctly? **Are you sure?** Find out for certain with System Diagnostic, which has complete diagnostic tests for every component of your TRS-80™ Model 1, 3 or 4.

- **ROM:** checksum tests.
- **RAM:** three tests including every location and data value.
- **Video Display:** character generator, video RAM, video signal.
- **Keyboard:** every key contact tested.
- **Line Printer:** character tests with adjustable platen length.
- **Cassette Recorder:** read, write, verify data.
- **Disk Drives:** disk controller, drive select, track seek, read sectors, formatting, read/write/verify data with or without erasing, disk drive timer, disk head cleaner. Single or double density, 1-99 tracks.
- **RS-232-C Interface:** connector fault, data transmission, framing, data loop, baud rate generator.

System Diagnostic \$99.95

MAILING LIST

Maintains mailing lists of over 1250 names per disk file. Add, change, delete, or find names. Sort according to the data in **any** field. Labels printed in 1, 2, 3, or 4 columns, with adjustable tabs.

Model 1, 3, or 4 version \$69.95
Mod. 2/12 or IBM version ... \$79.95

SMALL BUSINESS MANAGEMENT SYSTEM

A complete system for using your computer to manage a small business.

- **Order Entry:** enter orders, print invoices, change past invoices. Use pre-printed forms or plain paper.
- **Bookkeeping:** complete general ledger by user-defined categories. Print monthly or year-to-date summaries and ledgers.
- **Accounts Receivable:** show balances due from unpaid invoices at any time.
- **Accounts Payable:** show amounts you owe for unpaid bills in any category.
- **Inventory:** complete summary of products sold by part number and prices charged. Limited to 1,000 8-character part numbers (2,000 for MS-DOS).
- **Installation package** tailors the programs to your business.

Available for: TRS-80™ Models I, III, 4, 2, 12, 16 (TRSDOS), or 2000, IBM-PC, and most CP/M computers.

Need more information? Ask for our detailed description of this program with sample forms and reports.

All versions \$250.00

Howe Software

14 Lexington Rd., New City, NY 10595

Developing software for TRS-80 computers since 1979.

TYPITALL — *The most powerful TRS-80 Word Processor*

TYPITALL is a word processor which is upward compatible with SCRIPSIT™ for the TRS-80™ Models 1, 3 and 4. If you know SCRIPSIT™, you can start using TYPITALL immediately. Even if you have never used a word processor before, you will find TYPITALL easy to learn, and full of so many powerful features that you'll wonder why other word processors don't have them. Following is a list of some of TYPITALL's features. (If you need to know more, ask for our **free** catalogue.)

- Send **any** control or graphic/special character to the printer.
- Print the formatted text **on the screen** before going to the printer.
- Send the formatted text to a **disk file** for later printing.

"If you like SCRIPSIT™, you'll probably love TYPITALL." - **80 Micro**.

TYPITALL Demo Version	\$49.95
TYPITALL Complete Version	\$129.95
TYPITALL with Spelling Checker	\$179.95

HOME BUDGET and CHECKBOOK ANALYST

Combines the functions of a checkbook program with budget analysis, comparisons, summaries and projections.

First, it is a checking program, which can be used to maintain your checking account. Enter deposits, print check registers, compute your current balance.

The program analyzes your income and expenses, keeps track of your budget. Computes monthly and year-to-date income and expense summaries, and projections for the year based on data through a known month. Monthly expenses can be compared to a pre-established budget.

Model 1/3/4 disk version \$59.95
Model 1/3/4 cassette version .. \$29.95
Mod. 2/12 or IBM PC version .. \$69.95

SMALL BUSINESS ACCOUNTING

Based on Dome Bookkeeping Record #612, this program keeps track of income, expenses, and payroll for a small business.

Complete ledgers are maintained for both income and expenses. The program computes monthly, through last month, and year to date summaries.

The payroll section (not included in cassette version) contains provision for up to 99 employees with up to six categories of deductions. The program can print both checks and summaries of payroll for one employee or all employees.

Model 1/3/4 disk version \$59.95
Model 1/3/4 cassette version \$29.95
Mod. 2/12 or IBM PC version .. \$39.95

TRS-80™ MODEL III ASSEMBLY LANGUAGE

A complete course in assembly language, written for the **beginner**. Contents include:

- The Z-80 instruction set
- TRS-80™ Model III ROM and RAM
- Using the Editor/Assembler
- Reading, printing, and moving data
- Arithmetic operations with integers
- Floating-point and BCD numbers
- Logical and bit operations
- Cassette input and output
- USR subroutines in BASIC
- RS-232-C data communications
- Disk input and output
- The TRSDOS 1.3 disk operating system

With the book you can also purchase **Monitor #5**, a comprehensive machine language monitor and debugger program. (Monitor #5 also avail. for Models 1 & 4.)

Book only \$16.95
Monitor #5 only \$22.95
Book and Monitor #5 \$29.95

SMART TERMINAL

The **intelligent** communication program. Use your TRS-80 to communicate with other computers, bulletin boards, information services, time sharing, or for data transmission.

- Memory buffer holds data to be transmitted or received.
- Automatic transmission from buffer.
- Automatic storage of incoming data.
- Character translations.
- Data files compatible with word processors and BASIC programs.
- True BREAK key.

Model 1, 3 or 4 version \$74.95
Model 2/12 CP/M version ... \$79.95

24-Hour TOLL-FREE Order Number:
Outside California call:

(800) 428-7825, ext. 169

Inside California call:

(800) 428-7824, ext. 169

Visa, Master Card, or COD orders only.

For information call:
(914) 634-1821

Add \$3.00 postage & handling.
New York residents add sales tax

*TRS-80 is a trademark of Tandy Corp.

**QUALITY DISK DRIVES**

These drives are complete with power supply, cover and external drive connector. For TRS-80 Model I, III, 4, IBM PC and others. All drives are Double Density and step at 6ms or less. SS means single head, DS is double head. Specify white or silver color cover. Add \$5 per drive shipping unless otherwise specified. All drives have a one year warranty on parts and labor.

COMPLETE FULL SIZE 5.25" DISK DRIVES

40tk Single Side Tandon TM100-1	\$ 167
40tk Dual Side Tandon TM100-2	197
80tk Dual Side Tandon TM101-4	297

COMPLETE HALF-HIGH 5.25" DISK DRIVES

1ea. 40tk SS TEAC FD-55A in dual case	\$ 167
2ea. 40tk SS TEAC FD-55A in dual case	317
1ea. 40tk DS TEAC FD-55B in dual case	167
2ea. 40tk DS TEAC FD-55B in dual case	357
1ea. 80tk DS TEAC FD-55F in dual case	217
2ea. 80tk DS TEAC FD-55F in dual case	387

COMPLETE 8" DRIVES Add \$10 shipping

2ea. SS TM848-1E's in dual case with fan	\$ 647
2ea. DS TM848-2E's in dual case with fan	697

BARE 5.25" & 8" DRIVES Add \$4 shipping

40tk SS, Full Size, Tandon TM100-1	\$ 127
40tk DS, Full Size, Tandon TM100-2	167
80tk DS, Full Size, Tandon TM101-4	267
40tk SS, Half-High, TEAC FD55-A	147
40tk DS, Half-High, TEAC FD55-B	187
80tk DS, Half-High, TEAC FD55-F	237
8" SS, Thinline, Tandon TM848-1E	259
8" DS, Thinline, Tandon TM848-2E	333

TRS-80 MODEL III/4 DISK KITS

Internal drive kit complete with disk controller, power supply, mounting brackets, cables and all hardware plus step-by-step instructions. This kit contains everything you need (except the Disk Operating System, drive and a screwdriver) to convert your cassette Model III or 4 to fast reliable disk operation. Don't confuse this quality kit with the high-priced ripoffs. Thousands of satisfied customers cannot be wrong. You can join them for only \$189

Same as above with 1-40tk SS drive 299
Same as above with 2-40tk SS drives 419

TRS-80 MODEL I DOUBLE DENSITY CONTROLLERS Add \$3 shipping

Aerocomp "DDC" Really the best by test	\$ 99
Aerocomp "DDC" with LDOS	159
Aerocomp "DDC" with NEWDOS 80-v2.0	179

OTHER DRIVE GOODIES Add \$2 shipping

TRSDOS 1.3 Disk & Manual for Model III	\$ 24
TRSDOS 2.3 Disk & Manual for Model I	24
TRSDOS 6x Disk & Manual for Model 4	19
LDOS for the Model I or III	69
NEWDOS 80 v2.0 for the Model I or III	99
2-drive cable for Model I/II/4	24
2-drive external cable for IBM PC	48
4-drive cable for Model I	34
Extender cable, 7' long	9
5.25" power supply & endl., white or silver	59
8" power supply, fan & enclosure, beige	149

TRS-80 SPECIAL EQUIPMENT

12" Green Phosphor Monitor	79
12" Amber Phosphor Monitor	84
16K 200 nsec RAM Guaranteed 1 year (8 chips)	9
64K 200 nsec RAM Guaranteed 1 year (8 chips)	34
64K RAM plus Genuine PAL for Model 4 upgrade	44

MEDIA & SUPPLIES

5" Diskettes SSDS, Lifetime Guar. Pk of 10	\$ 16
5" Diskettes SSDS, Lifetime Guar. Pack of 10	19
5" Flipsort, holds 75 Diskettes	19
8" Diskettes SSDS, Lifetime Guar. Pack of 10	29
8" Diskettes SSDS, Lifetime Guar. Pack of 10	34
8" Flipsort, holds 50 Diskettes	24
5.25" or 8" Head Cleaning Kit	9
Letter Size 20 lb. Tractor Paper, 2900 sheets	25

You've Got **TOTAL ACCESS**

(specializing in TRS80 +)

TO YOUR COMPUTER HARDWARE & SOFTWARE NEEDS. CALL ROSE TODAY!

**ROSE GETS RIGHT!
NOW---ROSE'S
MOD 4 CP/M
\$ 69**

Complete with Manual

Rose has latched onto this slick version of CP/M 2.2 that allows you to run most of your favorite CP/M programs with ease. It even lets you read and write other manufacturers' disk formats. What could be nicer? They are in stock ready for you to use and enjoy.

PRINTERS & ACCESSORIES

PROWRITER 120cps, 10" Wide Friction/Tractor	319
PROWRITER 2, 120cps, 15" Wide Frict/Trac	595
STARWRITER F10-40cps Daisy Wheel	895
PRINTMASTER F10-55cps Fast Daisy Wheel	995
Rutishauser Bidirectional Tractor	150
Rutishauser Sheet Feeder, A Best One	495

**CP/M & 80 COLUMN
for your MODEL III**

No need to buy a new computer when you can use the Holmes VID-80 modification and get CP/M 2.2, 64K RAM and 80 column video. This kit is easy to install and requires no soldering. Even a do-it-yourselfer can end up with a complete 64K CP/M computer with an 80 column screen that is still able to run all your existing Model III software. For the first time you will be able to use CP/M programs that normal people do, such as dBASE II and WordStar. The regular price of this kit is \$524. Now Rose will get you going for only \$299

Add \$5 shipping

SUPER SALE

I'll ship you the Holmes deal above PLUS WordStar 3.3 installed and ready to run for only \$399

SPECIAL SOFTWARE DEALS

Add \$4 shipping	
WordStar 3.3 (Specify MM or R/S format)	\$ 195
MailMerge, SpellStar, StarIndex, all 3 for just	99
WordStar Professional (Above 4 Programs)	275
DataStar Data Entry & Retrieval	125
ReportStar Report Generator	105
InfoStar Advanced DBM's (Above 2 Programs)	195
dBASE II Complete With Disk Tutorial	345
Super Utility Plus 3.2 by Kim Watt	59
CP/M 2.2 for Model 4 by Monte Zuma	169
Turbo PASCAL by Bor Land. Requires CP/M	44
Turbo Toolkit by Bor Land	45
Turbo TUTOR by Bor Land	35
Pickles & Trout CP/M 2.2m for the Model	
2-12-16 Floppy Version	179
Same thing but the Radio Shack Hard Disk	219

ORDER NOW!**TOLL-FREE****800-527-3582****Orders Only Please**

Call in your order or write to us at the address below. Texas residents call us at 214-337-4346 and deduct \$2.00 from your order but you should remind me 'cause sometimes I forget. If you need technical information or service please call the Texas number as the Toll Free lines are just for orders only. Prices are subject to change without notice and are mail order only. I accept AMERICAN EXPRESS, MASTERCARD and VISA and I will not charge your card until I ship your goodies. You can send a check or a money order. I also accept COD orders but they require cash or a cashier's check upon delivery. If shipping charges are not shown please call for the correct amount. Add \$5.00 handling charge if your order is less than \$50.00. Shipping charges quoted in this ad are for the lower 48 states only. Orders to Canadian address add \$20.00 to pay for doing all those papers for customs. Texans add State Sales tax. No tax collected on shipments outside of Texas. Be sure you know what you are buying. SOFTWARE IS SOLD ON A REPLACEMENT BASIS ONLY - NO REFUNDS. If it is defective call us for instructions. Please order from me now---I need the money and I will not jack you around. I reserve the right to charge up to a ten percent restocking charge if you jack me around. All merchandise carries the original manufacturers' warranty and all repairs or adjustments will be made by the manufacturer or his designated representative.

NEXT DAY SHIPMENT of Goods in Stock.**TOTAL ACCESS****P.O. Box 790276****Dallas, Texas 75379****214-337-4346**

Student Special

A student in my Z80 Assembly-language course discovered this easy alternative to the traditional PEEK method of breaking down a VARPTR address into 2 bytes:

```
1000 DEFINT X,Y
1010 X = VARPTR(Y) 'ADDRESS OF Y
1020 X1 = X AND 255 'LOW BYTE
1030 X2 = S(X AND - 256)/25 'HIGH
     BYTE
1040 POKE 32766,X1
1050 POKE 32767,X2
```

POKE the bytes into RAM so that a USR statement can call them.

*Phyllis Lefton
Manhattanville College
Purchase, NY 10577*

Calling ROM

I stumbled on a ROM call that checks the condition of the printer from the printer status port (address 0F8H), saving you programming time as well as cutting down your program's byte count. The call, located at hex address 44BH (1099 decimal), is:

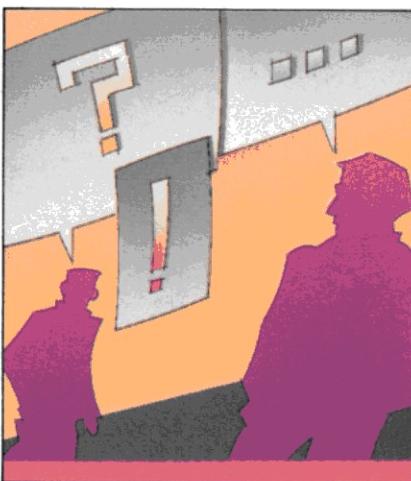
```
CALL 44BH      ;GET PRINTER
                STATUS
JR   Z,ONLINE  ;GO IF PRINTER
                READY
                (enter Not Ready routine here)
```

After the call, the computer sets the Z flag if the printer is ready. NZ tells you that the printer isn't ready; the computer then changes the contents of the A register.

*Dan Gookin
15202 Willow Road
Lakeside, CA 92020*

Thrifty Idea

Are any of you new Model 4P owners outraged over the price of Radio Shack's parallel printer cable (\$39)? Here's an alternative that saves you about \$20: Buy a Model 100 printer cable (Radio Shack catalog number



26-1409, \$14.95), and a 34-position card-edge connector (Radio Shack catalog number 276-1564, \$4.95).

Install the card-edge connector to the ribbon cable with the blue-striped conductor at position 1, and plug the connector into the Model 4P with the blue stripe toward the outside of the case. I left the Model 100 header connector in place on my cable, and can now use the one cable for both computers.

*Michael Shrout
200 N. 35th Ave., #98
Greeley, CO 80631*

Requests for Help

I'd like to correspond with people interested in exchanging programs and programming ideas. I'm 16 years old and use a Model III with two disk drives.

*Ellen Lackey
128 Newcastle
Jackson, MS 39208*

Reader Assistance

After ordering the tape-based version of Simutex's ZBasic compiler, I was informed that they've discontinued the disk. I'd like to hear from anyone interested in selling their version 2.2 or anyone who knows where I might be able to get it. Also, I'm in-

terested in obtaining the discontinued Active printer interface cable (Radio Shack catalog number 26-1411).

*Paul Brunelle
115 Delaronde Road.
Saskatoon, Saskatchewan S7J 3W2
Canada*

My version of Postman, the mass-mailing system for the Model III, is missing the Post-Rite portion that lets you write form letters and incorporate them with the addresses in the main program. Can anyone lead me to a copy of this portion of the program?

*Robert W. Smyka
12407 25 Mile Road
Utica, MI 48087*

I have a Model III with two disk drives (and access to a Model 4) and am looking for a program that will help local high school coaches to keep track of team statistics. I'd also like to be able to save this information to disk.

*Gary Sell
Box 262
Goodland, IN 47948*

Error Trap

The note in Reader Exchange (February 1985, p. 30) concerning J.L. Kissel's "Tape Transfer" is incorrect. To make the correction to Kissel's listing, change the code at sector 00, offset C0, from 53 to 5E.

*Bob Hardy
71014 Austin
Fort Hood, TX 76544*

In Table 3 of "Tandy Rides Again" (April 1985, p. 50), we misidentified one manufacturer. Educational Micro Systems Inc., not Educational Microware Inc., produces Convert 3 to 2000.—Eds.

On p. 94 of our April 1985 issue, we inadvertently indicated that the programs in Basic Takes were available

Introducing Super Utility 4/4P.

The indispensable first-aid kit for TRS-80 users only from PowerSoft.

Even the healthiest computer needs occasional "doctoring". And that's precisely what Super Utility 4/4P is for. To help you handle routine check-ups, take care of minor emergencies and perform major surgery with relative ease.

So effective it mends everything but a broken heart.

The latest generation of PowerSoft's highly-rated program contains over 60 different utilities. So you can examine file locations.

Reformat without erasing data. Test or manipulate memory. Save valuable data and disks. Revive dead files. And much, much more.

So easy you can perform near miracles in no time.

Version Four enhancements make Super Utility 4/4P easier, faster and more efficient than ever. It boots and loads 50% faster. Utilizes 64K for faster file

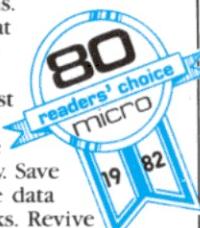
copies and backups. It's configurable with most Model I/III/4 operating systems for fast, easy transfer of files. And introduces three function keys, including a user-definable key, for easy, single-stroke operations.

So economical you can't afford to be without it.

At only \$79.95, SU4/4P can be yours. And that includes both a master and backup disk, 148 page manual, binder and full support. The more you know about your TRS-80, the more you'll want SU4/4P. The less you know about your TRS-80, the more you'll need SU4/4P.

So place your order today by calling or writing:

PowerSoft Products
17060 Dallas Parkway
Suite 114
Dallas, Texas 75248
214/733-4475



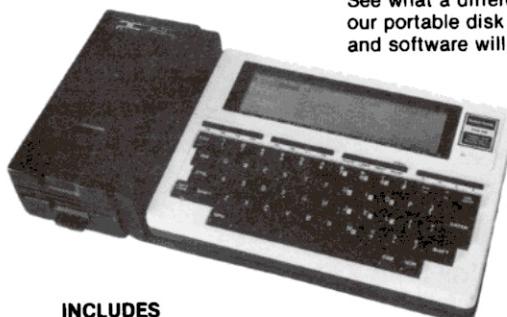
POWERSOFT

VISA and MasterCard welcome.

SU 4/4P	\$79.95
SU+ 3.2 Model I/III(4)	\$79.95
Please add \$3.00 S/H in USA & Canada;	
\$10.00 Foreign (airmail)	

3.5 Inch MicroDrive with Integrated Software \$799 Complete*

See what a difference our portable disk drive and software will make!



INCLUDES

- T/MAKER™ an Integrated Software Program with:
 - Wordprocessor
 - Spreadsheet
 - Spelling Checker
 - Relational Data
 - 50,000 Word Dictionary
 - Base Manager
- Communications Software (MODEM)
- Popular CP/M™ 2.2 Disk Operating System
- Additional 32K Bytes Ram for 64K Bytes Ram Total
- Battery Powered 3.5 in Drive, 360K Bytes per Diskette
- Battery Charger, Cables & Mounting Hardware Included

Attaches to your MODEL 100, NEC8201 and OM-10

CALL OR WRITE
PIC, 18013 Skypark Circle, Suite D, Irvine, CA. 92714
714-261-0503

*Does not include Computer, M.C., Visa or check, plus \$5 shipping and 6% sales tax California residents only.

Copy CP/M - TRS-80 - PC/MS-DOS!

HYPERCROSS/XT 2.0 Direct Disk To Disk File Transfer

Now you can CROSS the barrier between disk formats! Using HYPERCROSS you can directly COPY files between TRS-80 disks and many different CP/M and IBM PC disk formats on your own TRS-80 or MAX-80. You can also FORMAT an alien disk, display the DIRECTORY, and KILL files. If you have different computers at home and work, use HYPERCROSS to transfer manuscripts, BASIC, FORTRAN PASCAL or C programs, Visicalc files, data bases and binary files.

*New features - Mass files transfers and Alien to Alien Copy Now you can copy many files at once using the new TAG feature in HYPERCROSS which allows you to tag any number of files for mass copy or deletion. You can also copy directly from one alien disk to another with only two drives.

*Formats supported: IBM-PC and MS-DOS compatibles include DOS 1.1, 2.0/2.1 single and double sided and Tandy 2000. CP/M includes Aardvark, Access, Altos, ATR, CCS, Cromemco, DEC, Eagle, Epson, HP, IBM CP/M 86, Heath/Zenith, Kaypro, LNW, MAX-80 Morrow, NEC, Osborne, Otronra, Sanyo, Superbrain, Teletype, Televideo, TRS-80: Holmes, Hurricane Compacter, MM Shuffle Board, Montezuma, R/S CP/M 3.0+, Xerox, Zorba and standard 8 inch CP/M.

Hardware required: 48K and 2 drives minimum. Model 1 needs a doubler. Some formats need double sided or 80 track drives. 80 track skip supported.

PRICES including disk, manual and shipping:

Hypercross CP/M Single sided formats only	\$49.95
Hypercross PC/MS-DOS Single sided formats only	\$49.95
Hypercross XT V2.0 with 70 CP/M and PC formats	\$99.95

Please specify TRS-80 Model I, III, 4/4P, or MAX-80.

NEW Supplementary format package

Now available - an additional 60 formats making 130 in all including: Rainbow MS-DOS, MAX-80, Olympia, TI, Toshiba, Sharp, Heath-Magnolia, all 8 of the new Montezuma version 2.2x formats and many others. \$39.95 ppd. or \$20 if ordered with XT version.

HYPERZAP 3.2c Disk Magic!

If HYPERCROSS is the program for files then HYPERZAP is the program for sectors, tracks and whole disks! On the market for 2 years, HYPERZAP is more than just another disk copying program - it is the program for analyzing, copying, repairing, creating floppy disks of all kinds. It will copy any TRS-80 formats as well as many others such as CP/M, PC, CoCo etc. Specially designed to handle mixed density sectors on any track in any sequence. Many features for reading, writing, editing track and sector data. Hyperzap is the tool that lets you be in charge.

Make your own self booting disks.

Take your own CMD file and turn it into a dual booting Mod 1/III/IV disk. Autopilot mode allows learn, saves and repeats procedures. Disk comes with fascinating examples showing how to backup Funsoft, Copycat 3 and others - magic indeed!

Hardware needed: 48K 1 drive minimum. One version for all TRS-80 models 1, 3 and 4. Manual and disk \$49.95 ppd.

May your * TRS-80 * live forever!

PO BOX 5115, RALEIGH, NC 27609

(919) 847-4779 6-11 pm EST

*All trademarks are the properties of the companies represented.

READER EXCHANGE

on Load 80. The programs do not appear on the loader.—*Eds.*

New Bulletin Board Systems

The Post Office
Great Falls, VW
703-759-4053
Sysop: David Havill

Tec-Vec Computer Systems
Manitoba, Canada
204-885-7921
Sysop: Henry C. Yau

Fort McMurray BBS
Fort McMurray, Alberta
403-791-9367
Sysop: Peter Steeper

Austin Headquarters BBS
Austin, TX
512-469-5936
Sysop: Andre S. Chen

Fast80 (Master System)
Surrey, BC
604-594-7398
Sysop: Mel Patrick

DEBUG

Several readers are having problems with the DIM statement in FastBas ("Running Like the Wind," January 1985, p. 42). The usual solution is to remove the statement lines that precede the line with the DIM statement. As stated in the article, FastBas accepts only one DIM statement. You must put the DIM statement in the first line of the program, preceded only by a Clear statement. You even have to remove REM statements to insure proper compiling.

Thomas L. Quindry
TLQ Enterprises
6237 Windward Drive
Burke, VA 22015

Barry LaLone's Tidbit #17 (January 1984, p. 157) implies that it's possible to get 96 tracks out of a

MULTIDOS disk with a 40-track drive. MULTIDOS users should not, under any circumstances, use this procedure. The method described in Tidbit #17 is based on false assumptions and is dangerous to your good disks; it's not possible to produce a disk using the back-up function and an improper track count. If it were possible, MULTIDOS would surely be the best selling DOS on the market. MULTIDOS, however, will produce 96 tracks during regular back-up only if you have 80-track drives and hardware that formats out to 96 tracks.

David Welsh
President, AlphaBit
Communications, Inc.
13349 Michigan Ave.
Dearborn, MI 48126

Send correspondence to Reader Exchange, c/o 80 Micro, 80 Pine St., Peterborough, NH 03458.

Circle 214 on Reader Service card.

WILL YOU BUY COMPATIBLE? (OR) WILL YOU PAY TOO MUCH?

SERVICE AND WARRANTY NATIONWIDE

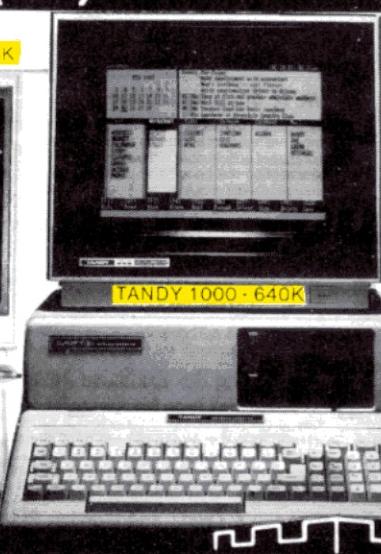
SAVE SALES TAX*
PLUS DISCOUNT

*Texas Residents Add Only 4 1/2%

Ask About Our
"30 Days
Buy-Back-Policy"



TANDY 2000 - 768K



TANDY 1000 - 640K

TANDY 1200 - 640K



SERVICE AND
WARRANTY NATIONWIDE



For
Prices
Call



FORT WORTH COMPUTERS

WE ARE SERIOUS ABOUT SAVING YOU MONEY

(Located 30 miles from Fort Worth)

377 PLAZA • GRANBURY • NR FORT WORTH, TEXAS 76048

CALL FREE NUMBER: 1-800-433-S-A-V-E

Monday thru Friday - 9:00 a.m. to 5:00 p.m. Texas Time
(Order Inquiries/Customer Service) IN TEXAS: 817-573-4111

ANYONE CAN USE OUR SOFTWARE!

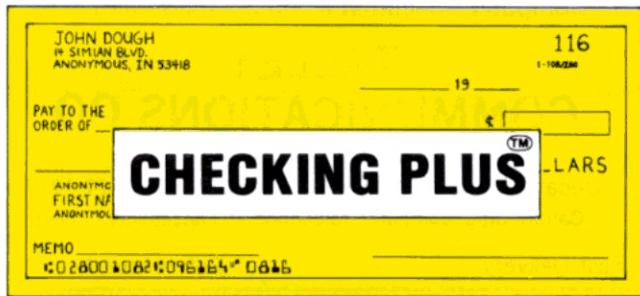


MAIL PAC II and CHECKING PLUS represent a new generation of computer software. Our software doesn't even need a manual! Anyone can quickly learn to use either package by following simple, explicit on-screen instructions. But, for those of you who insist -- we've included a complete user's manual as well.

Mailing Lists, Inc.
125 Main Street
Pleasantville, NY 10562

SAVANNA, CA
PM
1980

MAIL PAC II™



MAIL PAC II FEATURES:

High Capacity --

Stores from one to one million names in Zip Code, Numerical or Alphabetical order. The only limitation is your disk storage space.

Flexibility --

Prints your mailing list on 1, 2, 3, or 4-across labels (with up to 5 user-defined lines on each label) or as a compact, user-designed directory. The record length is completely user-defined, and each field within each of your records is completely variable (allowing storage of any number of characters for any particular address entry). Devote fields to telephone numbers, codes, or even special messages related to each particular name on file.

Powerful --

A built-in word processor allows you to create personalized form letters for each address on your list (or just a particular group of addresses).

Ease of Use --

Create new mailing lists, review existing lists, handle changes of address, delete cancelled names, sort lists, and purge duplicate names from your files. Complete on-screen instructions tell you in plain English exactly how to accomplish all of these tasks.

MAIL PAC II \$99.95

Both Programs Require 48K And At Least One Disk Drive (2 Drives For Higher Storage Capacities). And All Hard Disk Systems Are Supported.

FOR YOUR TRS-80™ • APPLE™ • IBM PC™ • NEC™ • OSBORNE™ • XEROX™ • KAYPRO™ • TELEVIDEO™ • ZENITH™ • SANYO™
DEC™ • TI PROFESSIONAL COMPUTER™ • SUPERBRAIN JR.™ • EPSON™ • Any CP/M™ Computer
CP/M-based Computers must be equipped with Microsoft BASIC (MBASIC or BASIC-80)

TRS-80 trademark Tandy Corp. - APPLE trademark Apple Corp. - IBM PC trademark IBM Corp. - ATARI trademark Atari, Inc. - OSBORNE trademark Osborne Corp. - XEROX trademark Xerox Corp. - KAYPRO trademark Non-Linear Systems, Inc. - TELEVIDEO trademark Televideo Systems, Inc. - SANYO trademark Sanyo Corp. - NEC trademark NEC Corp. - DEC trademark Digital Equipment Corp. - ZENITH trademark Zenith Corp. - TI PROFESSIONAL COMPUTER trademark Texas Instruments, Inc. - SUPERBRAIN trademark Intertec Corp. - CP/M trademark Digital Research - EPSON trademark Epson Corp.

OUR SOFTWARE CATALOG

H & E Computronics, Inc., has mailed more than 1 million software catalogs since 1978. Send \$2 for our new 64-page catalog today! (We also send you our catalog FREE with every order). **DEALER INQUIRIES WELCOME**

30-DAY MONEY BACK GUARANTEE

*** ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE ***
DELIVERY SUBJECT TO AVAILABILITY

ICOMPUTRONICS!

50 N. PASACK RD., SPRING VALLEY, N.Y. 10977

ADD \$3.00 FOR SHIPPING IN UPS AREAS
ADD \$4.00 FOR C O D OR NON-UPS AREAS
ADD \$5.00 TO CANADA & MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S.
CANADA & MEXICO



24 HOUR
ORDER LINE

(914) 425-1535

NEW TOLL-FREE

ORDER LINE

(OUTSIDE OF N.Y. STATE)

(800) 431-2818

DeskMate: Tandy's Software Starter Package

by Bradford N. Dixon

★★★★★

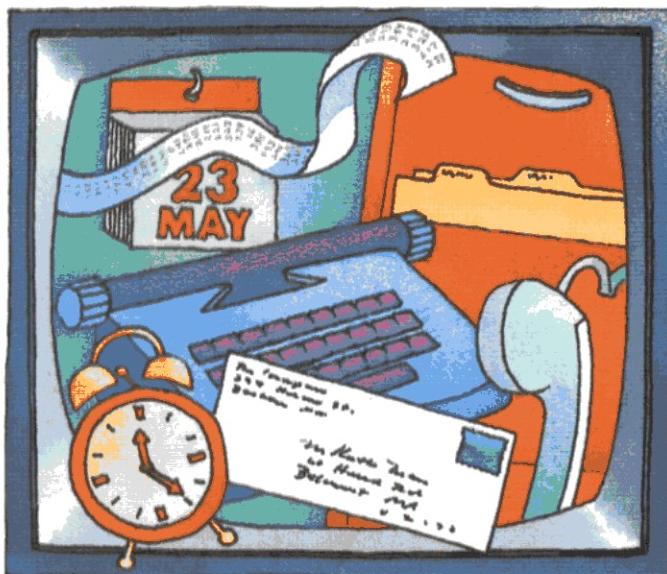
DeskMate runs on the Tandy 1000 and requires one disk drive. Tandy/Radio Shack, One Tandy Center, Fort Worth, TX 76102. Free with Tandy 1000 purchase.

Easy to use: ★★★★★
 Good docs: ★★★★★
 Bug free: ★★★★★
 Does the job: ★★★★★

One of the things that impresses me about the Model 1000, in addition to the fact that I got an IBM PC-compatible for \$1,199, is the bundled software Tandy includes with the hardware. I've never seen a more complete set of software accompany a new computer, certainly not from the Tandy Towers. DeskMate, Tandy's appropriately named package, provides six applications (a word processor, a spreadsheet, a filer, a daily calendar, telecommunications, and electronic mail) that, taken in toto, provide an impressive software starter system. And all of DeskMate's programs "communicate" with one another, making the package truly integrated.

Although 1000 owners may eventually upgrade to more advanced programs (and in some cases you really have to), DeskMate will serve new users quite well. One of the modules, the telecommunications program, is good enough to serve users for the life of their 1000. Others, like the calendar and mail packages, either have so little utility or are so amateurish that you'll never use them or you'll replace them with more sophisticated software at some point.

edited by Ryan Davis-Wright



The Main Menu

When you boot up DeskMate after answering the MS-DOS date and time prompts, the screen displays a calendar for the current month with the date highlighted, a box labeled Events for Today, and the integrated programs (with a directory of their files) arranged in a row underneath (see the Photo).

The software comes up in black and white on Tandy's CM-2 color monitor, but you can get a color menu by pressing the control key along with either the F1, F2, or F3 keys.

DeskMate highlights the text program on boot-up, but you can pick any of the five applications by repositioning the cursor with the arrow keys.

DeskMate's main menu functions appear in a bar at the bottom most portion of the screen, along with the F1-F10 function keys assigned to them. The functions let you change the system date and time, rename a

file, display the free space on the current disk, engage or disengage the alarm function, set up host communications parameters, assign DeskMate a password, select a series of data files for deletion, duplicate a data file, delete a single data file, and swap drives.

You display DeskMate's subfunctions menu by pressing the F11 key; this lets you access the current program's help menu, display DeskMate's calculator, see the alarm event information, turn the alarm on and off, display a telephone book, set printer parameters, and change the system date

and time. You invoke the subfunctions by pressing the alternate and F1-F7 keys (see Table 1).

Text

You couldn't really consider Text a full-function word processor. In fact, it's closer to the Model 100/200's Text program than to a commercial word processor. Like these, you're always in the insert mode; when you enter characters on an existing line, the current text shifts to the right without overwriting any of the old material.

Model 1/III/4 users may find Text a bit frustrating compared to Scripsit because it lacks some of the latter's special functions, like centering and justifying. But Text was never intended to be anything more than a simple text entry and printing program. Given these limitations, it performs the basic word-processing operations well.

Text uses the 1000's function keys to good advantage. It's easy to manip-

"I am amazed at the broad spectrum of technical articles you publish, for both novice and advanced programmers . . ."



If you're still wondering which magazine you should buy for your TRS-80*, here's what **80 Micro** readers have to say about their #1 system-specific information source—

● "Not only is the magazine very professionally done, but I have found something in almost every issue that has been worth the price of the subscription . . ."

*Roger L. Holstege
Millersville, MD*

● "I was greatly impressed by your magazine. I got more useful information from that one issue of **80** than I have from countless other sources . . ."

*John M. Crittenden
Jackson, MS*

● "I have found **80 Micro** to be the most valuable magazine pertaining to home computers on the market . . ."

*William C. Hardin, Jr.
Charlotte, NC*

80 Micro is the magazine for every TRS-80 user—from beginner to advanced. **80 Micro** is full of tutorials, free programs, hardware modifications, new product announcements, product reviews, debugging tips, and more.

And an **80 Micro** subscription is risk-free. If you're not completely satisfied, you'll be reimbursed for all undelivered issues. See what **80 Micro** can do for you. It's #1 for a lot of people. Fill out this order form and send it in now.

*TRS-80 is a trademark of Radio Shack, a division of Tandy Corp.

Yes! I want a no-risk subscription to the magazine for beginner to advanced TRS-80 users. Send me 12 issues of **80 MICRO** for \$24.97! I'll save 48% off the newsstand price!

Payment Enclosed Bill me

Name _____

Address _____

City _____ State _____ Zip _____

Canada & Mexico, \$27.97. Foreign surface, \$44.97. 1 year only. US funds drawn on US bank. Please allow 6-8 weeks for delivery.

80micro • PO Box 981 • Farmingdale, NY 11737

ulate your work after you enter it. Finding strings of words in your file is as simple as pressing the search key (F1) and entering the string you want to find. If you need to substitute one string with another, pressing the F2 key prompts you for the string you want to find, then asks for the replacement string. Unfortunately, Text asks if you want to replace the string at every occurrence; I would have preferred automatic replacement, with the option of being queried.

Other Text features include a Format command to preview your document on-screen before you print it out and a merge function that accepts text from one file and adds it on to the current file. You can also move blocks of text around within a file.

Of course, Text lets you print out files in whatever format you want. Press the alternate and the F6 keys, and a menu of print options lets you define the printout's format. You can print an entire document or only that portion displayed on the screen.

Worksheet

Worksheet is a 99- by 99-cell spreadsheet that supplies all the basic spreadsheet functions necessary to set up accounting forms, budget sheets, or perform what-if calculations on numeric data. If you need help, the alternate and F1 keys bring up instructions on how to use it.

As in Text, you can find strings in the workspace or specify cells you

The Star Ratings

80 Micro's star ratings reflect our reviewer's impression of a product.

In most cases, the overall rating is an average of the ratings in each of the four specific categories. However, some overall ratings may be higher or lower than this average, depending on the reviewer's subjective opinion.

The stars mean:

★★★★★ Superior; ★★★★ Excellent;
★★★ Good; ★★ Fair; ★ Poor.

The ratings terms translate as follows:
Easy to use: How easy is it for the new user to use the hardware/software/book?

Good docs: Is the documentation clear and helpful in explaining the product's use and anticipating user problems?

Bugs: Did the reviewer encounter any bugs while using the product?

Does the job: How well does the product do what it was designed for?

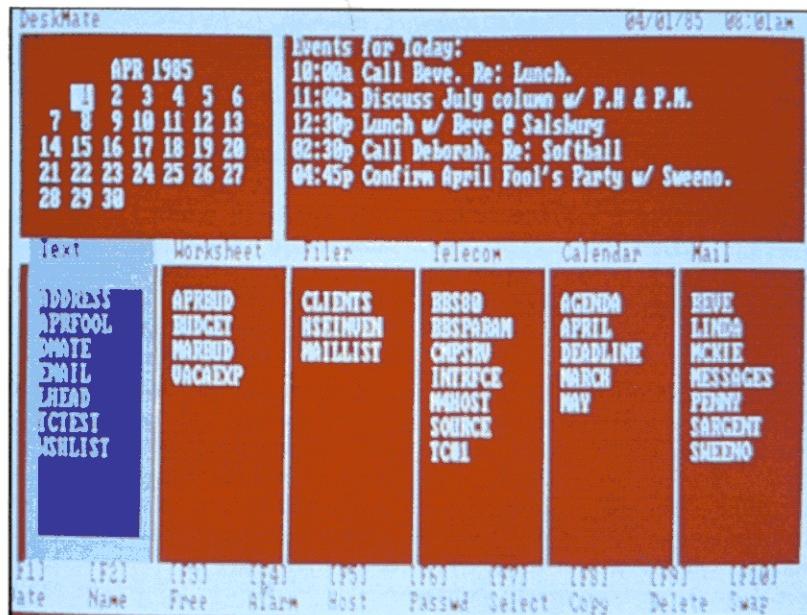


Photo. DeskMate's main screen.

want to edit. The worksheet calculates data according to the formulas you enter and prints the information using the same print commands Text uses.

One of Worksheet's nice features is that it lets you merge a document written in Text with information in the spreadsheet. Also, if one of your previous spreadsheets has information needed for the current job, you can merge one spreadsheet file with the one you're working on. Worksheet displays all the functions needed to manipulate data at the bottom of the screen, a nice feature.

Because Worksheet works like most commercial spreadsheets, you'll have little problem making the transition to full-fledged spreadsheets when you've outgrown Worksheet's capabilities.

Filer

DeskMate's Filer is a free-form data base manager that supports records with as many as 21 fields of up to 255 characters each. You are limited only by your imagination in setting up the forms for the data base, so the variety of applications can be very flexible.

You can search for and sort data by any field in the record. The F1 key invokes the Find function to search through the data base, and it supports a wildcard function.

You start the search by entering Boolean operators to select information that is equal to, greater than, or less than data in the search field. The F3 key displays all the records that

match your find criteria. You can add or delete information from a record, or eliminate entire fields. You print out the records that match your search criteria by pressing the F4 key.

As with Text and Worksheet, Filer has a merge function that takes information from any other DeskMate file and merges it with Filer's current one.

Filer offers a unique data base application that automatically dials any phone number you highlight in a record by pressing the F2 key. While you can't use this option to call Compu-Serve or an electronic bulletin board, you can use it to make phone calls (you have to set the telecommunications program for voice dialing before you call from Filer, however).

Telecom

Telecom, the telecommunications module, is the most advanced of all DeskMate's applications. When accessed from the main menu, Telecom displays a menu of 10 parameters. It supports autodial modems and you can specify the number of times the modem redials a busy number. You select the baud rate from a range of 110-9,600 bits per second, as well as the parameters for word length, number of stop bits, parity, ASCII character and line feed filter options, and XON/XOFF file transfer protocol control. All Telecom lacks is an option to invoke XMODEM transfers from bulletin boards systems.

If you frequently access data bases

COUNTERPOINT

While some reviewers will question DeskMate's role as a software sampler, others will say, "Don't look a gift horse in the mouth." It's true that compared to Framework or Symphony, DeskMate's pretty bad; but compared to other free software, like Exploring the Apple IIc or PCjr's ROM-based Meet Your Keyboard, it's terrific.

DeskMate is worst when it forgets its modest purpose and assumes it's a program you'll leave on 24 hours a day. Calendar and Alarm work beautifully, but will anyone type in all that appointment data? I don't anticipate many offices using Mail, and I can't envision many people booting up DeskMate, entering the host mode, then leaving on a two-week trip and sending back messages via their Model 100.

But, as a group of genuinely integrated, albeit limited, programs with a consistent user interface, DeskMate is remarkable. Not only will novice 1000 buyers learn what a spreadsheet is and how to set up a data base, they'll learn advanced applications like how to splice spreadsheet rows into a business letter. And once they've bought better programs, they'll still use DeskMate for jaunts outside their specialties.

—Eric Grevstad

Deskmate tries to address the beginner's hoary question, "Now that I have a computer, what do I do with it?" But for experienced users, DeskMate just doesn't offer needed functions.

I bought a 1000 as a home computer. I don't turn it on before I go to work, so the calendar and alarm functions have limited utility for me.

I don't have a modem, so the electronic mail, host, and phone functions aren't particularly useful. Creating a name and address data base with Filer doesn't interest me at all. A desk-bound black book can't supplant the portability of the real thing. And I use a calculator and paper to handle my household finances, so I don't need Worksheet.

That leaves Text. I spent about 10 minutes with it and went looking for a real word processor. It just doesn't

have the features I need for writing.

My primary purpose for Text, editing Basic programs, isn't even mentioned in DeskMate's literature. Tandy probably omitted this for the same reason it didn't include a Basic manual with the 1000, whatever that may be.

I realize that DeskMate wasn't designed for the likes of me: an experienced user with narrow needs. DeskMate is a simple package designed to give inexperienced users a taste of different computer applications. As for curmudgeons like myself, we know what we want before we buy a computer.

—John Mello

The Tandy 1000 is unabashedly promoted as an IBM PC twin. But five minutes into DeskMate had me thinking not of Big Blue, but of the Model 100.

I liked the simple documentation: There's a quick-reference brochure for those who dive into the lake without testing the water, and a simple manual for the more reflective types.

I'm most familiar with the Model 100's text program and while DeskMate is similar, it is also easier to use and more versatile. The most interesting application turns the bottom of the screen into a 21-function calculator, while retaining the text above.

Worksheet is serviceable, and Filer provides a way to store, retrieve, sort, and otherwise juggle information. This may well be DeskMate's strongest point.

An alarm mode that reminds me I'm late for a meeting? A calendar to plan my month? A phone list with a maximum of 78 entries? These are interesting, but not very useful.

DeskMate requires an 80-column monitor, so it's useless without a high-resolution monochrome or color display. If you had planned to avoid the cost of a monitor and use your TV set with your Tandy 1000, you won't be able to escape the 40-character mode. In that case, DeskMate will be useless, even though it's included as part of the 1000 package.

—Richard Ramella

and bulletin boards, you can create auto log-on files that automatically call any entry in your log with just a few keystrokes. You can also preset parameters for favorite bulletin boards and save them to the log-on file. To run Telecom with those parameters directly from the main menu, position the cursor over the desired Telecom log file and press the enter key.

You enter the terminal mode by pressing the F5 key, which displays a blank screen and a new choice of functions for the 1000's function keys. Telecom provides buffer controls and keys for uploading and saving buffer contents, and pressing the alternate and F1 keys list helpful hints. If you find your parameter settings incorrect after you connect with a remote host, hit the F12 key to return to the Telecom menu, change the parameters, then return to the terminal mode to continue telecommunications.

Telecom is comparable to many commercial terminal programs on the market. It's easy to learn and use, and unlike some of DeskMate's other integrated parts, you'll probably never have to replace it with a more powerful program.

Calendar

The Calendar module is an event scheduler intended as your electronic appointment book. You can record future events with this date and the time. Calendar provides a convenient week-at-a-glance format so you'll know exactly what's going on and when.

As in other applications, the F1 key initiates a search through your calendar for events of particular interest. However, if you want to see what's on tap for a specific date, use the date key (F2) and DeskMate displays information for that date on the screen.

DeskMate's alarm function, which you set from the program's main menu, shows important appointments in the Events for Today window in DeskMate's opening display.

The Calendar program also lets you merge files from other modules. You can select portions of a calendar file and save them as a document file, then merge them into Text or Worksheet with a single keystroke.

I found the best use of this program is its integration with the alarm function. It's easy to lose track of time when you spend hours in front of the

computer. If I set the alarm before working in Text or Worksheet, DeskMate signals me at a preset hour.

Mail

Mail acts as a computer-based notepad where people can write messages addressed to a specific person. You could describe it as a local bulletin board without the board.

To leave a message, you hit the F2 key, answer the From prompt and write a brief description of the message. Then enter the name of the recipient and the program goes into the text mode. You can enter as much text as you want, with no restrictions on length. To send the message (i.e., file it for the recipient), you press the F12 key.

You can search through the Mail file by message author, date, or description. You get a display of messages by pressing the F3 key; alternatively, you can print out a message by pressing the F4 key.

Mail has great potential for having some fun, especially if many people use your particular Tandy 1000. On a more practical basis, Mail would be useful as a message center for people in and out of contact with their office who need to receive their messages.

The Documentation

One of the pleasant surprises I found with DeskMate is its documentation. It comes with three booklets to help you get the most out of the software. *The DeskMate Reference Manual* is an in-depth booklet that contains all the information you'll need to use the program. It is separated into chapters by program module, so you don't have to rifle through its 82 pages to find how to get back to the main menu from Telecom's terminal mode.

DeskMate also comes with a tutorial guide that holds your hand from the time you open the Tandy 1000 box and hook it up until you're acquainted with all its features. Also, Tandy includes a quick-reference guide for times when you don't need a full explanation. Taken together, DeskMate's documentation is the best I've seen for any Tandy program.

Conclusion

It's easy to see why Tandy is so high on their newest computer and its bundled software. DeskMate's a product that hits the mark in every ap-

plication a new user might need. And it's hard to equal as a "comes-with" package—it makes the Tandy 1000 a ready-to-go MS-DOS machine with a variety of applications. ■

Late-Breaking News

As this review went to print, Tandy announced an upgraded version of DeskMate, version 1.1. According to Tandy, the new DeskMate provides the following enhancements:

- The alarm beeps eight times instead of three.
- The printer driver form-feeds before printing the next page.
- The Swap function lets you store DeskMate data on drive B.
- The main menu offers improved color selection.
- The spreadsheet stores color definitions for file columns.
- The spreadsheet rounds numbers instead of truncating them.
- You can reset Find criteria without returning to a data base's first record.
- The filer module provides an increase in capacity to 550 records for the 128K Tandy 1000.
- The telecommunications program includes a delay function for slow modems.
- The calendar module offers an expanded buffer that lets you store up to 100 events.
- The calendar's intermittent file input/output errors are corrected.
- You can merge files on two different drives.
- You can overwrite host files.
- The Host mode disconnects a phone line if a user gives an incorrect password three times.
- The printer setup lets you use arrows.
- The Phone feature gives you faster dialing.

You can order DeskMate 1.1 from your local Radio Shack Computer Center; it's free to registered Model 1000 owners. The enhanced DeskMate includes no instructions, but a text file on the disk outlines new procedures.

A Utilities Grab-Bag For TRSDOS 6.X

by Hardin Brothers

★ ★ ★ ★ ★

LS-Utility Disk runs on the Model 4/4P (64K) and requires TRSDOS 6.X. Logical Systems Inc., 8970 N. 55th Street, P.O. Box 23956, Milwaukee, WI, 53223, 414-355-5454. \$49.

Easy to use: ★ ★ ★ ★ ★

Good docs: ★ ★ ★ ★ ★

Bug free: ★ ★ ★ ★ ★

Does the job: ★ ★ ★ ★ ★

I think TRSDOS 6.2 is the best operating system ever developed for 8-bit computers (and maybe for any personal computer). But like any DOS, it may lack the utilities necessary to meet all your computing and programming needs. Logical Systems Inc., the creators of TRSDOS 6.X, fills the utilities gap with their reasonably priced package of eight programs called the LS-Utility Disk.

The utilities include a calculator program, an expanded keystroke multiplier, an input/output device filter, a printer driver, a disk sector analyzer, a program that reads 35- and 40-track disks on an 80-track system, a character filter, and an enhanced job control language file. The programs aren't related to each other in any way, but rather seem to be a collection of utilities LSI decided not to sell separately.

CALC/FLT

You install CALC/FLT, a keyboard filter, with the TRSDOS Set and Filter commands. It's a simple calculator program you invoke whenever you press clear/shift-C. It clears (and saves) the top line of the screen, displays a prompt, and waits for a command. This calculator can convert values from decimal to binary or hexadecimal (hex), from binary to hex (but not to decimal), and from hex to binary or decimal. It can also add and subtract hex numbers.

The calculator's range is limited to 8 bits for binary numbers, four digits for hex numbers, and the integer range (-32768-32767 and 0-65535) for decimal numbers. Once you invoke the calculator, you can perform as many base conversions and calculations as you want, then press clear/shift-C to return to your program. CALC/FLT restores the top screen line and the cursor to their former positions.

KSMPLUS/FLT

You can use TRSDOS 6.X's key-stroke multiplier (KSM) program for program development, but it has several limitations. KSMPLUS overcomes some of them.

Three different versions of KSMPLUS are available. The simplest is KSMPLUS1, which adds four new special-function keys. You can also define the F1-F3 keys (both shifted and unshifted) as KSM keys, for a total of 32 predefined KSM keystrokes.

With KSMPLUS1, pressing clear/shift-X displays, but doesn't execute, the last DOS command you entered. You can then edit the command. This offers a distinct advantage over TRSDOS 6.X's control-R function, which automatically reruns the last DOS command without giving you the opportunity to change it.

Everyone will find the other three special-function keys useful: clear/shift-T makes KSMPLUS send a Top-of-Form command (CHR\$(12)) to the printer, clear/shift-Z generates the current system date in MM/DD/YY format, and clear/shift-S generates the current system time in HH:MM:SS format.

KSMPLUS2 includes all the KSMPLUS1 features plus one other: you can redefine any KSM key while KSMPLUS is active. Pressing clear/shift-E puts you in a key-edit mode. You can change or add to the definition of any KSMPLUS key (including F1-F3). The only limitation is that you define enough free memory space when you enter KSMPLUS to store the new definitions.

KSMPLUS3 is identical to KSMPLUS2, except that after you define or redefine a KSM key, KSMPLUS3 restores the screen to its condition before you started editing.

PRCODES/FLT

If your printer provides true backspacing, PRCODES/FLT adds three functions to the TRSDOS *PR driver. It prints all zero characters as slashed zeros, and it supports boldface printing and underlining.

You install PRCODES/FLT with up to four optional parameters. The first defines your printer's backspace character. PRCODES/FLT supports printers that require a single backspace character and those that require

a 2-byte command sequence to backspace (for example, ESC-8).

Once installed, you can use a single nonprinting character to toggle bold printing and underlining on and off. PRCODES/FLT creates boldface printing by forcing the printer to backspace and reprint each bold character. One parameter lets you specify how many times you want to print over each character.

Unless otherwise instructed, PRCODES/FLT creates underlining by backspacing and printing an underline character.

If your printer already has slashed zeros, bold-strike, and underlining capability, you may not find this filter useful. On the other hand, if it doesn't have those features, PRCODES/FLT may be a better (and cheaper) alternative to buying a new printer. However, PRCODES/FLT only operates on characters sent through the TRSDOS printer driver. Since many word processors handle printer output directly without using the DOS driver, PRCODES may not operate successfully with your word processing program.

READ40/CMD

If you use 5½-inch, 80-track drives with your Model 4, you know the frustration of not being able to read 40-track disks on those drives. READ40/CMD creates a special driver in high memory that allows an 80-track drive to read a 40- or 35-track disk. You could use it to copy the files on a 40-track disk to another drive, then disable it to return to normal 80-track service.

The driver that READ40/CMD creates is capable only of reading information from a disk; you can't use it to write to that disk or with the TRSDOS Repair command. However, you can use it to read TRSDOS 1.3 disks with the Convert utility included in TRSDOS 6.X. In addition, you can invoke DOS functions like the Directory, Copy, and Back-up commands using the READ40 drive as a source.

Since I don't have an 80-track drive, I was unable to test READ40/CMD. However, one of its functions is to display an informative drive table of all eight possible logical drives. READ40 would do so on my system,

but the documentation fails to indicate what the table means.

TRAP/FLT

TRAP/FLT is the simplest program on the LS-Utilities disk. It traps any individual character sent to or from any logical device, and keeps that character from appearing in the input or output stream. For example, you may want to prevent the computer from sending a CHR\$(23) to the display to stop someone from accidentally turning on the expanded (40-) character mode while a program runs. You could do so by filtering the display driver *DO with a copy of TRAP/FLT to capture and discard all CHR\$(23) bytes sent as output.

TRAP/FLT is capable of trapping only a single character. If you want to use it to trap more than one character, you can either install it several times or use MAXLATE/FLT instead.

MAXLATE/FLT

KSMPLUS (and TRSDOS 6.X's KSM/FLT) only filter keyboard input and only respond to a limited range of input characters. MAXLATE/FLT filters any input or output to a logical device (screen, keyboard, printer, RS-232 line, disk file, and so on).

MAXLATE can change any input or output character to any other character or group of characters (or to a null). First, you have to create a translation table either with the TRSDOS Build command or with a text editor. The translation table merely lists the characters you want MAXLATE to intercept, plus the new character or characters to which you want them changed. You can express values in the translation table in either hexadecimal or ASCII format.

For example, if you wanted to create an output filter attached to a printer that translates every zero to the string "0 (zero)" and every letter O to "O (oh)", the translation table would look like this:

30 = "0 (zero)"
4F = "O (oh)"

You can make more than one copy of MAXLATE active at any one time, with each translating either the input or output of any logical device. The LS-Utilities package includes two predefined MAXLATE files: one changes the Model 4 QWERTY key-

Continued on p. 110

Circle 449 on Reader Service card.

Professional Handicapping Systems



by Professor Jones

GLD. Thoroughbred "Gold" Edition™

A "Full" featured thoroughbred analysis designed for the professional and serious novice. \$159.95 complete

EGLD. Enhanced "Gold" Edition™

"Gold" Edition with complete Master Bettor™ system integrated onto the same disk. This powerful program will transfer all horses and scores to the bet analysis with a "single keystroke." (Master Bettor™ included) \$199.95 complete

GLTD. Limited "Gold"™

Enables Professional Handicappers to assign specific values to the racing variables "they" feel are important. Create program weight based on a particular track and fine tune it for maximum win percentage. This program is designed for "ease of use." The user needs no programming experience. (contains Integrated Bettor™) \$299.95 complete

GD. Gold Dog Analysis™

The only professional dog handicapper on the market, includes:

- | | | |
|-------------------------|--------------|-------------------------------|
| 1) Speed | 4) Post Last | 7) Running Style |
| 2) Post Today | 5) Distance | 8) Weight |
| 3) Kennel | 6) Condition | 9) All new internal weighting |
| 10) NEW class indicator | | |

If you are near a greyhound track, you can't afford not to use this program. \$149.95 complete (with integrated Master Bettor™) \$199.95

Limited Dog™ \$299.95**PPX. Professor Jones' Football Predictor, Prof. Pix™**

Complete Football Analysis with Data-Base. 1) Overlays 3) "Super Plays" 5) Data Base Stats 2) Point Spreads 4) "Over/Under" bets 6) Holds "100" teams

Highest percentage of winners 1984

\$49.95 complete \$99.95 with Data Base Management

MHH. Master Harness Handicapper™

Professional software designed to provide a thorough analysis of all trotter and pacer races in North America and Canada. \$159.95 complete with integrated Master Bettor™ \$199.95

NBA. Basketball™

This data base managed analysis will provide the user with "ALL" betting situations while storing relevant information on the disk.

\$79.95 complete with Manual

LOT. Lottery Analysis™

Statistical comparison program designed to detect subtle patterns in winning lottery numbers. \$49.95 complete with Manual

BROCHURE AVAILABLE

IBM™
APPLE™
TRS-80™
CPM™
COMMODORE™

Prof. Jones
1114 N. 24th St.
Boise, ID 83702



48 HR. FREE
SHIPPING

CALL
208-342-6939

TERMS: FREE SHIPPING
ALL SOFTWARE. Add
\$6.00 UPS Blue/C.O.D.
Add \$6.00/Add 3 weeks
personal checks/ Add
4.5% ID residents/Add
\$6.00 outside U.S.A./
Prices subject to change

Circle 27 on Reader Service card.

*TRS-80 MODEL I-I II-IV-HD1200-1000 (Software Discounts) SAVE\$\$\$\$\$ CALL\$\$\$\$\$

1. Disk Operating Systems

DosPlus 3.5.....\$59.95
DosPlus IVA.W/Mzal.\$119.95
DosPlus 3.5 & IVA..\$159.95
MULTIDOS 1.6D.....\$59.95
MEDIT-PC(Text Edit)\$169.95

4. Terminal Communication

Mterm..mod 1-3-4....\$59.95
BBS-80 (Board-Svs)..\$69.95
BBS-PC (Board-Svs).\$229.95

6. Conversion Programs

Conv3 to 4.....\$49.95
Conv3 to 1000.....\$139.95
Conv3 to 2000.....\$139.95

7. THE King James Bible Complete old and new testament +

Over 3.5 mil bites on 13 diskette called THE WORD
BIBLE MOD 1-3-4-IBM-PC & XT. MOD 1000 & 1200. CPM 2.2
THE WORD ...any Z-80 or any 8088 also Apple.....\$199.95
TOPICS (over 200 subjects) works with bible\$49.95

8. MIRACLE Telecommunication IBM-PC(sheet-graph-script)\$289.99**DESIGN SOFTWARE**

Toll Free 24 hrs 1-800-622-4070(Illinois)1-800-942-7317

Technical Ser (702) 384-9320 Tues & Wed 12 To 3 pm

Box 42847 Las Vegas, NV 89104

TERMS: M.C./Visa/Checks/C.O.D. Prices subject to change

#trademark of the Tandy Corporation

PowerSCRIPT 4.2

The state-of-the-art UNIVERSAL add-on enhancement for SCRIPSIT® users!

Now supports TRUE Model 4/4P

80 column version of SCRIPSIT

Supports ALL released versions of SCRIPSIT® for 4/III/I.

Get the MOST from your printer!

Our PowerSCRIPT modification for SCRIPSIT (all versions) gives you everything that SuperSCRIPSIT does, except for proportional printing, but we give features that even SS doesn't have! Our files are full of letters from enthusiastic users who cannot believe how powerful little ole SCRIPSIT can become with PowerSCRIPT!(and this version adds even more features!)

With all the smarter printers out there, it doesn't make sense to use a "dumb" word processor anymore. If you notice, there are MANY word processors out there besides the ones available from TANDY. We could recommend every one of them, IF YOU WANTED TO BUY SOMETHING NEW! What if you don't want to pop another \$200 bucks for another program? What if you don't NEED another program, but you'd like a LOT of new features without relearning a WHOLE NEW SYSTEM? SCRIPSIT is a VERY good program - we just give it some horsepower and bring it up to today's standards! PowerSCRIPT gives you MANY new features, while retaining the commands you already know - at a very low price! All your previous files will, of course be compatible.

Some features that get added to SCRIPSIT via PowerSCRIPT 4.2:

- Send commands to printer to activate special formats and functions, even embedded in the middle of the line!
- Get an ALPHABETICAL Directory from within PSCRIPT and FETCH, KILL, or CHAIN, any file right from the display! No more going back to DOS!
- Keyboard can be customized for special needs or keys.
- Special characters can be generated from keyboard without using special printer codes!
- Removes protection for your own use.
- Any code from 1 through 255 can be sent to printer through special format line.
- Video PAGE FORWARD OR REVERSE at a key-stroke!
- Multiple files can be CHAINED together at print time!
- Will not crash programs protected in HIGH MEMORY.
- "END" returns to DOS READY quickly instead of rebooting operating system.
- Built-in HELP command! HELP can be modified by user.
- Optionally select line feed after carriage return.
- Support for user-definable filters included.

For Model 4/4P, III, or I (lower case only.) Works with most Model I/III operating systems or TRSDOS 6.0-6.2 on the Mod 4. Will work OK with TRSDOS 2.7D, except for DIR from PSCRIPT. Purchaser must own appropriate version of disk-based SCRIPSIT.

PowerSCRIPT 4.2 Still only \$39.95**SuperSCRIPSIT® Users...****We didn't leave YOU out!**

Now you can use SuperSCRIPT on your NON-Tandy printer! Your printer will work great using our special Printer Drivers customized for your particular printer and SuperSCRIPSIT. Low priced too, so don't miss out if you have one of the printer models listed! Model 4 fully supported!

- EPSON MX-80/100 series
- EPSON FX/RX 80/100 series
- Most all EPSON "compatibles"
- Okidata 92/93 Dot Matrix
- C. Itoh 8510 Prowriter
- C. Itoh A10-20 Daisy
- C. Itoh F-10 Starwriter

All features of SuperSCRIPSIT are supported to the fullest capabilities of the printer. Easy to install at OPEN DOCUMENT screen easy to use, and no extra commands to learn!

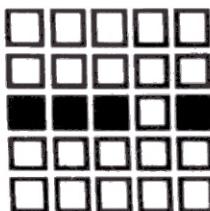
PowerDRIVER-Only 29.95 ea.

PLEASE SPECIFY PRINTER TYPE!

17060 Dallas Parkway, Suite 114

Dallas, TX 75248

(214) 733-4475



PERRY COMPUTERS

TANDY

LIST
PRICE

OUR
PRICE

TANDY 1000

25-1000 Model 1000 128K 1 Disk Drive	\$1199.00	\$ 995.00
25-1003 Modem Option 1000/1200	179.95	153.00
25-1004 Memory Exp 128K 1000/1200	299.95	255.00
25-1005 Disk Drive Expansion 1000	299.95	255.00
25-1006 RS-232C Interface 1000/1200	99.95	85.00
25-1007 Hard Disk Control Board	329.95	280.00
25-1009 2ND Memory Board	249.95	215.00
25-1501 MS-DOS Reference T-1000	34.95	29.00
25-1502 BASIC Reference T-1000	34.95	29.00
25-1155 Scripter 1000	299.95	255.00
25-1145 Lotus 123 1000	495.00	420.00
25-1151 DR Graph 1000	195.00	161.00

TANDY 1200

25-3000 Tandy 1200 1 Disk & 10 Meg HD	\$2495.00	\$2070.00
25-3010 VM-3 Green Monitor	219.00	185.00
26-3212 CM-2 Color Monitor	549.95	468.00
25-3040 Monochrome Display Adapter	219.00	185.00
25-3043 Graphics Display Adapter	299.00	255.00
25-3044 Graphics Master	695.00	590.00
25-3061 Captain Multifunction Board	795.00	675.00
25-3130 MSDOS/BASIC	89.95	76.50
25-3170 Wordstar Professional	395.00	335.00
25-3160 Framework	695.00	590.00
25-3161 PFS File	140.00	119.00
25-3190 dBase III	695.00	590.00

TANDY 2000

26-5103 Tandy 2000 2 Disk Drive	\$2499.00	\$2010.00
26-5104 Tandy 2000 1 Disk & 10 Meg HD	3950.00	3175.00
26-5111 Monochrome Monitor	199.95	165.00
26-5112 Color Monitor	649.00	535.00
26-5140 Hi Res Graphic Monochrome Bd.	359.95	305.00
26-5141 Hi Res Color Graphics Chips	149.95	125.00
26-5160 Internal 128K Memory Board	299.00	250.00
26-5300 Lotus 123	495.00	420.00
26-5311 Microsoft Multiplan	195.00	166.00
26-5320 Framework	695.00	590.00
26-5352 dBase II (Data Base)	595.00	420.00
26-5330 Multimate	249.00	205.00



THE BEST BUYS IN TOWN...

Perry Computers has been in the Computer Business for seven years and has offered you incredible products at outstanding prices. We plan to continue giving you quality merchandise at irresistible discounts. The basis of our philosophy is affordability and every effort is made to extend opportunity to you. We invite you to shop and compare.

PORTABLE-COLOR

LIST
PRICE

OUR
PRICE

MODEL 200

26-3860 24K Model 200 Portable Comp	\$ 999.00	\$ 829.00
26-3866 24K RAM Mem. Exp. Chip for 200	249.95	212.00
26-3804 AC Adaptor	5.95	5.00
26-3805 Acoustic Coupler	39.95	34.00
26-3816 8K RAM Memory Expansion Chip	119.95	95.00
26-1409 Printer Cable	14.95	12.70
26-1410 Modem Cable	19.95	17.00
26-3809 Briefcase	49.95	42.50
26-3811 Soft Carrying Case for 100/200	39.95	34.00
26-1183 Bar Code Reader	99.95	85.00
26-3806 Disk Video Interface	799.00	660.00
26-3829 Multiplan ROM for 100	149.95	127.50

COLOR COMPUTERS

26-3127 64K Extended Color Computer 2	\$ 219.95	\$ 185.00
26-3136 16K Extended Color Computer 2	159.95	130.00
26-3129 Thinline Disk Drive O for Co Co	349.95	290.00
26-3018 Extended Basic Kit	39.95	36.00
26-3030 OS-9 With Editor Assembler	69.95	59.50
26-3012 Deluxe Joystick	39.95	34.00
VIP Integrated Library	149.95	139.00
VIP Writer	69.95	59.00
VIP Calc	69.95	59.00
Telewriter Disk	59.00	59.00
BOTEK Interface	57.00	

MONITORS

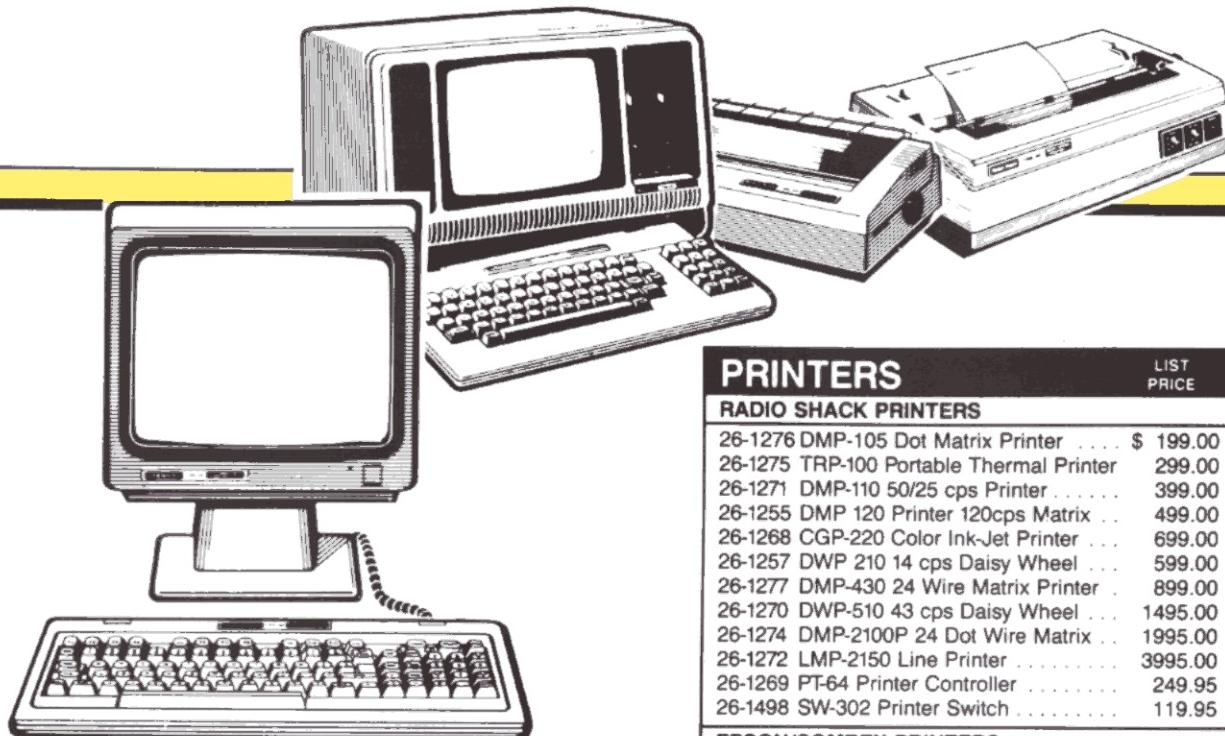
30261110 Amdek 300 Green	\$ 179.00	\$ 140.00
30261120 Amdek 300A Amber	199.00	155.00
30261130 Amdek 310A Amber	230.00	175.00
30261150 Amdek 300 Color Composite	349.00	280.00
30261160 Amdek 500 Color RGB/Comp	525.00	400.00
30261170 Amdek 600 Color RGB	599.00	475.00
30261210 Comrex 5600 Green 12"	119.95	95.00
30261220 Comrex 5650 Amber 12"	129.95	110.00
30261230 Comrex 6550 Color Composite	329.95	285.00
30261260 Comrex 6700 Color RGB Hi Res	549.00	450.00
30261510 Teknika MH22 RGB/Composite	399.00	340.00
30261410 NEC 12" Color Composite	250.00	

FOR ORDERS CALL 1-800-248-3823

We also carry a complete line of computer accessories
(Please call for current prices.)

FOR INFORMATION CALL 1-517-625-4161

All prices and offers may be changed or withdrawn without notice. Advertised prices are cash prices. Call for shipping charges. C.O.D. accepted. (\$4.00 charge per carton on C.O.D. Call for further C.O.D. information.) M.C., VISA, AX, add 3%.



PERSONAL-BUSINESS

LIST
PRICE

OUR
PRICE

MODEL 4

26-1069 Model 4 64K 2 Drive Computer	\$1299.00	\$ 950.00
26-1080 Model 4P 64K Portable Computer	1299.00	950.00
26-1122 64K Memory Expansion	79.95	75.00
26-1127 Model 4 Internal Drive 1	499.95	415.00
26-1123 Model 3 to Model 4 Upgrade Kit	799.00	675.00
26-1084 Model 4P Modem Board	149.00	127.00
26-1085 Model 4P Travel Case	24.95	21.25
26-1530 Multiplan Model 4	199.00	169.00
26-1595 Super Scriptor Model 4	199.95	169.00
26-1635 Profile 4 Model 4	249.95	212.00
26-2216 CP/M Plus Model 4	149.00	127.00
26-2231 Double Duty Utility	69.95	58.00

MODEL 12 & 6000

26-4005 Model 12 80K 2 Drive Computer	\$3999.00	\$2700.00
26-6021 Model 6000 512K 2 Dr Computer	4499.00	3735.00
26-6022 Model 6000 512K 15Meg HD	5499.00	4565.00
26-6014 Model 12 to 6000 Upgrade	1595.00	1325.00
26-6015 Model 6000 512K Memory Board	1095.00	905.00
26-6016 Model 6000 512K Memory Kit	849.00	705.00
26-6017 Card Cage For Model 12	199.00	169.00
26-6052 DT-100 Data Terminal	795.00	650.00
26-4155 15 Meg Hard Drive Primary	1995.00	1695.00
26-4171 35 Meg Hard Drive Primary	2995.00	2545.00
26-4157 Installation Kit for Primary HD	349.00	295.00

COLUMBIA & SANYO

10021020 VP2110 Columbia Ptb 2 Dk 128K	\$2495.00	\$2120.00
10021030 VP2220 Columbia Ptb 2 Dk 256K	2695.00	2290.00
10021040 MPC4210 Columbia 2 Dk 128K	2495.00	2120.00
10021050 MPC4220 Columbia 2 Dk 256K	2695.00	2290.00
10021060 MPC4610 Columbia H Dk 128K	4195.00	3565.00
10021070 MPC4620 Columbia H Dk 256K	4395.00	3795.00
10021080 MPC47 50 Columbia Pro 10 M 512K	4995.00	4140.00
10021090 MPC4950 Columbia Pro 30 M 512K	5995.00	4975.00
10041020 MBC555-2 Sanyo 1 Drive 128K	999.00	850.00
10041040 MBC555-2 Sanyo 2 Disk 128K	1495.00	1250.00
10041550 CRT-36 Sanyo Green Screen	199.00	160.00
10041560 CRT-70 Sanyo Color Screen	749.00	640.00

PRINTERS

LIST
PRICE

RADIO SHACK PRINTERS

26-1276 DMP-105 Dot Matrix Printer	\$ 199.00	\$ 169.00
26-1275 TRP-100 Portable Thermal Printer	299.00	230.00
26-1271 DMP-110 50/25 cps Printer	399.00	299.00
26-1255 DMP 120 Printer 120cps Matrix	499.00	385.00
26-1268 CGP-220 Color Ink-Jet Printer	699.00	595.00
26-1257 DWP 210 14 cps Daisy Wheel	599.00	485.00
26-1277 DMP-430 24 Wire Matrix Printer	899.00	745.00
26-1270 DWP-510 43 cps Daisy Wheel	1495.00	1225.00
26-1274 DMP-2100P 24 Dot Wire Matrix	1995.00	1650.00
26-1272 LMP-2150 Line Printer	3995.00	3315.00
26-1269 PT-64 Printer Controller	249.95	210.00
26-1498 SW-302 Printer Switch	119.95	100.00

EPSON/COMREX PRINTERS

20001010 RX-80 Dot Matrix Printer	\$ 269.00	\$ 230.00
20001020 RX-80 F/T Dot Matrix Printer	399.00	299.00
20001030 FX-80 Dot Matrix Printer	599.00	410.00
20001040 JX-80 Color Dot Matrix Printer	799.00	610.00
20001050 HI-80 4 Pin Plotter	599.00	450.00
20002010 RX-100 Dot Matrix Printer	499.00	405.00
20002020 FX-100 Dot Matrix Printer	889.00	625.00
20003010 LQ-1500 18 Pin Head with Intf	1495.00	1185.00
20003510 CR-IIIE Comrex Com Riter	499.00	400.00
20001510 FX-80 Tractor	39.95	34.00
20004080 NLQ Parallel Interface	209.95	175.00
20004030 RX/FX 2K Serial Board	119.00	90.00

PRINTERS

20021010 Okidata Microline 82	\$ 349.00	\$ 295.00
20021020 Okidata Microline 92	499.00	410.00
20022040 Okidata Microline 93	799.00	679.00
20041020 Star SG10 Printer	399.00	265.00
20061010 Toshiba Printer 1340		835.00
20081010 C. Itoh 8510AP Printer		335.00
20081510 C. Itoh 1550 Printer		660.00
20081520 C. Itoh F-10 Starwriter		1175.00
20081530 C. Itoh F-10 Printmaster		1475.00
20121010 Juki 6100 Daisy Wheel Printer	549.00	439.00
20181010 Mannesmann Tally MT-160L	798.00	675.00
20181020 Mannesmann Tally MT-180L	1098.00	935.00

SHOP WITH US ...

Our knowledgeable and courteous staff is always available to assist you, whether it concerns taking an order on our toll free line or helping you select the right computer system. Helping you compare and select, regardless of your needs, business or personal, our trained sales personnel are here to offer you superior service that complements our prices.

CALL TOLL FREE

1-800-248-3823

124 S. MAIN ST. PERRY, MICH. 48872

FIGHT SIMULATOR



The term "computer simulation" means different things to different people, but in my line of work it means a kind of synthetic experiment.

As an operations analyst with a specialty in computer-based simulations, I've designed models of armed combat, surveillance and border patrol operations on the U.S.-Mexico boundary, and air defense. I've also simulated procedures for safeguarding nuclear materials. In each simulation, my purpose was to determine how the interactions of random factors affect the real-world process I simulated.

In this article, I'll explain what a simulation does and how it works. As a sample program, I'll use a relatively simple Model III combat simulation called Endgame.

The Method

The simulations I design use the Monte Carlo simulation technique, which involves artificially acting out a random process many times, storing data from each repetition, and analyzing that data.

As with any Monte Carlo simulation, you must first create a model of the process you're simulating. The model is simply your perception of the process's critical components and how they interact, so opportunities for error are limitless. In fact, most bad simulations are based on an underlying model that's flaky.

In formulating this model, you need a clear idea of the kind of information you want to get from the simulation; when you plan any kind of experiment, you need a clear understanding of just what it is you're trying to find out. In Endgame, I'm mainly interested in the losses each side incurs, and in which weapon types in the opposing force inflict these losses.

Since the whole point of a simulation is to mimic real-life circumstances complete with chance occurrences, a simulation assigns random values to factors that affect a situation. The values selected depend on a probability curve; some events are likely to happen the same way every time, while others are less predictable. The quality of your model depends on the quality of the probability distributions for the key factors in a simulation.

When I say "random" I mean, of course, pseudorandom values. Most programmers use a congruence algorithm of one sort or another for randomness that yields a series of numbers that behave, for practical purposes, like random numbers. (For more background on Monte Carlo simulation techniques, see "The Business of Planning," September 1983, p. 74.)

In addition to using a good model, you must replicate the simulation enough times to get valid (stable) results. A simulation's stability, or reliability, depends on the number of times

you repeat the simulation. This means that fast execution speed is highly desirable, because in some cases you might want to replicate the experiment hundreds of times.

When you see a simulation built on an excessively complex model, it often turns out that the designer included extraneous components in the interest of "realism." But a simulation isn't reality and nothing you do can make it real. If you build your model in terms of realism, instead of selecting those components that influence the process, you're not engaged in an experiment but in imitative magic. This approach creates confusion about what the simulation can and cannot tell you, and results in a slow-running program with abundant crannies in which bugs can hide.

The Endgame Model

Endgame is a critical-event-sequenced Monte Carlo simulation; that is, as time passes, the program sees that specified events occur in a certain order.

Endgame simulates the passage of time by seeding random values in its event clocks, which the main routine

System Requirements

Models I, III, 4, and 1000

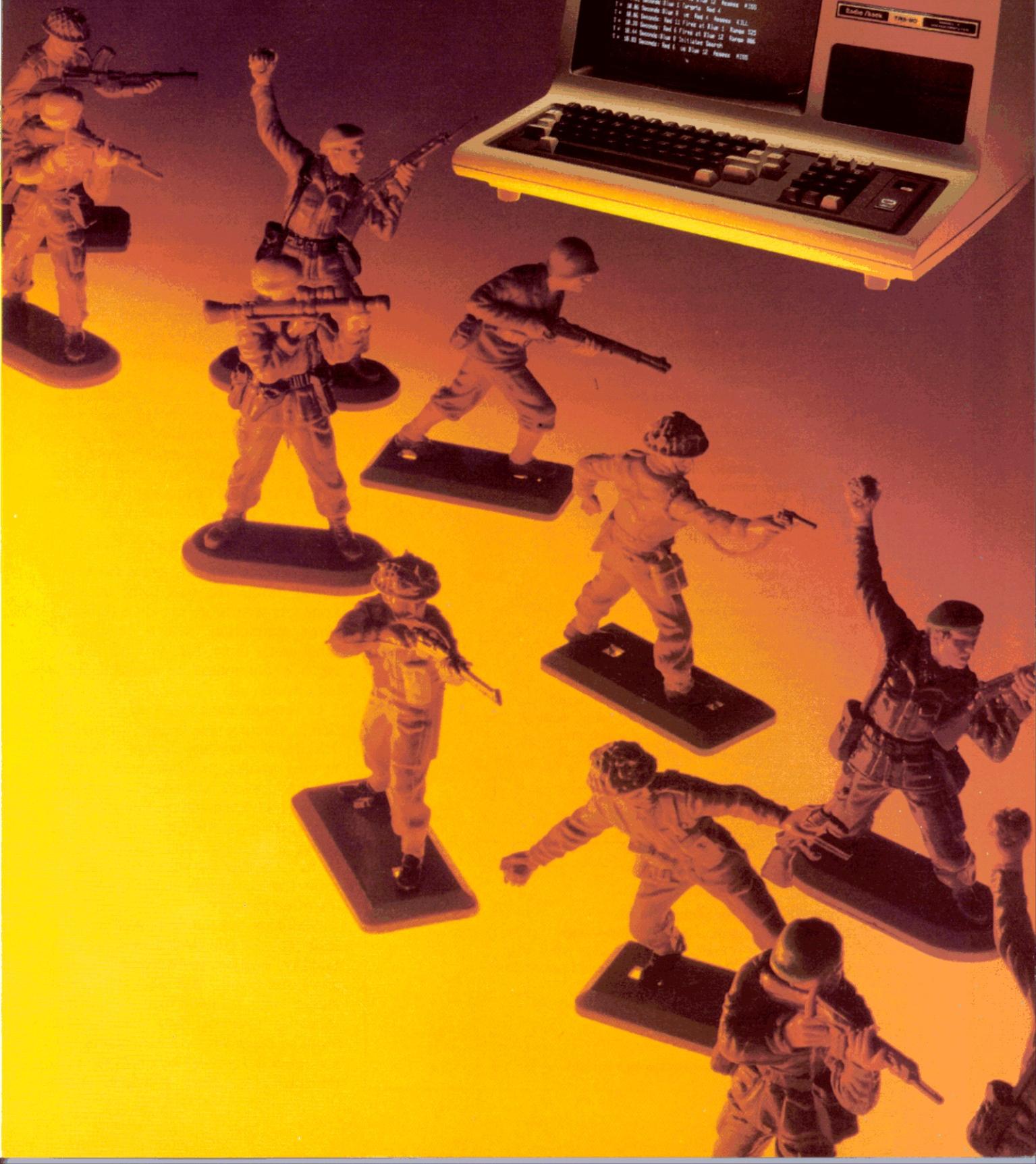
32K RAM

Disk Basic



**A professional simulation engineer describes
the design and implementation of a
Model III/4 combat simulator.**

by Joe R. Capps



```
T> 0.00 Seconds: Blue 1 Initiates Search
T> 0.40 Seconds: Blue 1 Targets Red 4
T> 0.40 Seconds: Red 12 Fires at Blue 12 Range 125
T> 0.70 Seconds: Blue 1 Initiates Search
T> 0.70 Seconds: Red 12 Fires at Blue 12 Range 112
T> 0.95 Seconds: Blue 4 Initiates Search
T> 0.95 Seconds: Blue 9 Targets Red 4
T> 1.00 Seconds: Red 1 in Blue 12 Resumes KIT
T> 1.40 Seconds: Red 12 in Blue 12 Resumes KIT
T> 1.40 Seconds: Blue 1 Targets Red 4
T> 1.40 Seconds: Blue 12 in Blue 12 Resumes KIT
T> 1.40 Seconds: Blue 12 Targets Red 4
T> 1.40 Seconds: Blue 12 in Blue 12 Resumes KIT
T> 1.40 Seconds: Red 4 Fires at Blue 1 Range 125
T> 1.40 Seconds: Red 4 Fires at Blue 12 Range 100
T> 1.40 Seconds: Red 4 Initiates Search
T> 1.40 Seconds: Red 4 in Blue 12 Resumes KIT
```

Variable	Description
IC(60)	Event clocks (starting with Blue)
IG(60)	Target
IL(60)	Status flag (a1 = Alive, 0 = defunct)
IR(60)	Range to target
IV(4)	Projectile velocity
JB(60)	Random dithering bias on X coordinate
JL(4)	Time to aim weapon
KD(4)	Mean time to detect (seconds)
LP(32)	Target priority
LT(60)	Weapon/target type
MF(8)	Rounds fired accumulator
MX(32)	Killer/victim accumulator
NP(2)	Number of elements per side (1 = Blue, 2 = Red)
PA(4)	Presented area of target (square meters)
PV(4)	Average projectile velocity (meters/second)
PZ(16)	Conditional kill probability, point blank range
P1(16)	Conditional kill probability, 2000 meters
QF(8)	Accumulates sums of squares from MF
QL(32)	Accumulates sums of squares from MX
XM(4)	Mil error of weapon
ZF(8)	Accumulates MF each replication
ZL(32)	Accumulates MX each replication
IX	Side (1 = Blue, 2 = Red)
IZ	Side (IZ = 3 - IX)
JX	Serial ID of acting element
JY	Serial ID of target element
KX	Basic event code
LX	Event clock index of acting element
LZ	Event clock index of target element
JT	Elapsed time
IS	18 (time resolution is 18 counts/second)
KL	18 (one second)
IT	32,4000 (infinity)
MB	High memory address where number of Blue resides
MR	High memory address where number of Red resides
MT	High memory address where number of Blue + Red resides
IE	Address - 1 of IE in high memory
IH	Address - 1 of IH in high memory
IK	Address - 1 of IK in high memory
IO	Address - 1 of IO in high memory
JR	Address - 1 of JR in high memory
LO	Address of event code of acting element
KG	Maximum game time
KF	Flag to trigger postprocessing
JH	Flag for printout
GT	Elapsed time accumulator
QB	Blue losses accumulator (sums of squares)
QR	Red losses accumulator (sums of squares)
QT	Elapsed time accumulator for sample mean
TB	Blue losses accumulator for sample mean
TR	Red losses accumulator for sample mean

Table 1. Endgame's principal variables.



scans for the lowest value, called a low clock. The time in the low clock is the present; the values in the other clocks represent the future. As the value of the low clock changes, time progresses.

Endgame recognizes five critical events in the combat simulation: Initiate Search for Target, Select Target, Fire at Target, Assess Result of Fire, and End of Battle. These events and their interactions, together with user inputs and the probability distributions associated with them, constitute my model of a fire fight.

Although many analysts would consider my model woefully lacking in realism, I think that for the limited type of engagement it represents, it's quite adequate. It makes sense to expand a model only if the added factors significantly influence the simulation's outcome.

Survival of the Fittest

Of all the warlike simulations designed during the past three decades, none has seen more use than the Endgame simulation, which involves a small-unit, direct-fire ground battle, typically dominated by armored fighting vehicles.

Governments use this kind of simulation in selecting new designs for fighting vehicles, whether they be tanks, infantry fighting vehicles, or mobile assault guns.

Three factors characterize such designs: power train and on-board fuel capacity, the weapons system proper, and armor protection. Any concession, in terms of weight or volume, to one of these features comes at the expense of the other two.

Analyzing and testing of weapons systems provides information on a vehicle's mobility, weapons performance, and armor protection. But the operations analyst looks for more than isolated performance trials of these systems. He wants to know what combination of major design features will best help the vehicle survive and fight effectively under

Variable	Description
IE (255 bytes)	Exponential structure
IH (480 bytes)	Probability of hit versus range
IK (480 bytes)	Conditional kill probability versus range
IO (60 bytes)	Event codes corresponding to event clocks
JC (60 bytes)	X coordinates
JR (250 bytes)	Range look-up table
KC (60 bytes)	Y coordinates

Table 2. Data blocks in high memory.

In the Endgame scenario, Red and Blue forces face each other on a battlefield. The individual fighting units are weapons, not men.

various threats in an attrition environment. (When an operations analyst speaks of "attrition environment," he means approximately, "A guy could get killed in a place like this.")

Endgame is an example of this kind of design testing. True, it's a limited example; the elements can't move, and the maximum size of the forces is on the small side. But my objective was a program that could easily fit in a 32K system.

Program Listing 1 is the main program. Program Listing 2 is the clock scan routine's source code. Table 1 lists the program's principal variables; Table 2 describes data blocks in high memory. Tables 3 and 4 show modifications for the Models 4 and 1000, respectively.

The Players

In the Endgame scenario, Red and Blue forces face each other on a battlefield extending 2,500 meters east and west and 1,000 meters north and south. The Blue line of battle is the extreme western edge of the field. The engagement range, a user input, determines the nominal position of Red's battle line.

The program uses a range resolution of 100 meters to calculate the probability of a hit or kill and a round's flight time. So you can think of the battlefield as a neat grid of 100-meter squares.

The program's individual fighting units are weapons, not men. I loaded the program with data describing four types of armored fighting vehicles; they're the same for the Red and Blue sides.

Although these weapon systems are hypothetical (in the interest of keeping me out of jail), you can make some assumptions based on the data describing each one. Type 1 is almost certainly a heavy battle tank. It probably weighs in at close to 60 tons and fires a flat-trajectory, kinetic-energy round that would penetrate just about anything on the battlefield.

Type 2 is a light tank that fires a

SET HINEM AT 61000.

Replace corresponding lines in Program Listing 1 with the following:

```

1000 CLEAR :DEFINT I-N:GOTO 2500 :This is ENDGAME/BAS
1030 CLS:PRINT CHR$(23):PRINT#498,"KILLER/VICTIM MATRIX"
2010 DEF USR8=$HF000:DEF USRL=$HF00D:PP$="POSTPROCESSING"
2020 JR=$HF5D8-1:IE=$HF4D9-1:IH=$HF119-1:IK=$HF2F9-1
2030 IO=$HF0DD-1:MB=$HF0DB:MR=$HF0DC:MT=$HF0D8
2040 JC=$HF6D2-1:NB=NP(1):NR=NP(2):NT=NB+NR:KC=JC+68
4190 IF LM=1 THEN PRINT#678, MS; ELSE PRINT#678, BL$;
4210 FOR I=-4896 TO -3883:READ J:POKE I,J:NEXT I:RETURN
4220 DATA 229,221,225,221,118,0,221,182,1,34,214
4226 DATA 248,281,229,221,225,221,118,0,221,182,1
4230 DATA 34,75,247,58,74,183,254,1,48,7
4240 DATA 62,1,58,74,247,24,4,175,58,74
4250 DATA 247,221,42,75,247,253,33,221,248,14
4260 DATA 1,58,74,247,254,1,48,14,58,216
4270 DATA 246,79,61,22,0,95,253,25,221,25
4280 DATA 221,25,58,216,248,71,33,255,255,34
4290 DATA 81,247,237,91,81,247,221,182,1,221
4300 DATA 118,0,183,237,82,48,18,25,34,81
4310 DATA 247,221,34,217,248,121,58,88,247,253
4320 DATA 126,0,58,79,247,58,74,247,254,1
4330 DATA 32,9,221,35,221,35,253,35,12,24
4340 DATA 7,221,43,221,43,253,43,13,16,198
4350 DATA 58,88,247,79,58,219,248,183,185,56
4360 DATA 13,62,1,58,77,247,58,88,247,58
4370 DATA 78,247,24,17,62,2,58,77,247,58
4380 DATA 219,248,79,58,88,247,183,153,58,78
4390 DATA 247,33,77,247,17,6,0,6,4,221
4400 DATA 42,214,248,126,35,221,119,0,221,25
4410 DATA 16,247,126,35,221,119,0,126,221,119
4420 DATA 1,201

```

Also, replace the Model III [character with ^ in lines 1680, 1720, 1730, 1760, 1790, 1880, 1810, 1860, 1890, 3950, and 4000.

Table 3. Endgame modifications for the Model 4.

Set HINEM at 45000.

Replace corresponding lines in Program Listing 1 with the following:

```

1000 CLEAR :DEFINT I-N:GOTO 2500 :This is ENDGAME/BAS
1060 NX=NX+1:KP=0:IF NX=NE THEN KP=1:CLS:LOCATE 5,17:PRINT "ENDGAME",
2330 CLS:LOCATE 9,13:PRINT "KILLER/VICTIM MATRIX"
2620 CLS:GOSUB 2670 :GOSUB 3020 :LOCATE 5,17:PRINT "ENDGAME";:GOSUB 3780
4190 IF LM=1 THEN LOCATE 9,26:PRINT M$; ELSE LOCATE 9,26:PRINT BL$:
4210 FOR I=-28480 TO -28385:READ J:POKE I,J:NEXT I:RETURN
4220 DATA 139,7,163,214,176,283,144,144,144,144
4230 DATA 144,144,144,168,74,183,68,1,116,7
4240 DATA 176,1,162,74,183,235,5,176,0,162
4250 DATA 74,183,139,55,191,221,176,181,0,138
4260 DATA 14,216,176,178,1,168,74,183,68,1
4270 DATA 116,16,138,22,216,176,188,0,136,208
4280 DATA 254,288,1,198,1,198,1,199,184,255
4290 DATA 255,163,81,183,161,81,183,139,28,57
4300 DATA 195,115,18,137,38,81,183,137,54,217
4310 DATA 176,136,22,88,183,138,53,136,54,79
4320 DATA 183,168,74,183,68,1,117,7,78,78
4330 DATA 71,254,194,235,5,78,78,79,254,282
4340 DATA 226,288,168,88,183,136,196,138,38,219
4350 DATA 176,183,0,48,216,128,4,136,196,183
4360 DATA 1,254,199,136,62,77,183,136,38,78
4370 DATA 183,198,77,183,139,62,214,176,185,4
4380 DATA 0,138,4,136,5,78,131,199,6,226
4390 DATA 246,139,4,137,5,283

```

Delete lines 4480 to end.

Also, replace the Model III [character with ^ in lines 1680, 1720, 1730, 1760, 1790, 1880, 1810, 1860, 1890, 3950, and 4000.

Table 4. Endgame modifications for the Model 1000.

Program Listing 1. Endgame/BAS.

```

1000 CLEAR 768:DEFINT I-N:GOTO 2500 :'This is ENDGAME/BAS
1010 'MEMORY SIZE?=45000:MOD I,MOD III. 26 JAN. 1985
1020 IF IL(LX)<1 THEN IC(LX)=IT:KX=0:RETURN
1030 POKE LO,2:IC(LX)=JT+PEEK(IE+INT(RND(.1)*MM)+1)*KD(L):RETURN
1040 KX=5:KB=(IZ-1)*NP(IX)+1:KE=KB+NP(IZ)-1:K=INT(RND(.1)*NP(IZ))+1+KB-1
1050 M=(IX-1)*16+(L-1)*14:FOR I=1 TO 14:MP=M+I
1060 FOR J=1 TO NP(IZ):K=K+1:IF K>KE THEN K=KB
1070 IF IL(K)=0 THEN 1090
1080 LZ=K:IF LT(K)=LP(MP) THEN IG(LX)=K:J=NP(IZ):I=I4:KX=2

```

Listing 1 continued on p. 46

kinetic-energy round. Type 3 is a little murky, but may fire a shaped-charge round and depend on a pulsed laser for good range information.

Type 4 is probably some sort of armored personnel carrier, judging from its huge profile. Its weapon appears to be some sort of guided missile, probably controlled by a joystick.

The Simulation

After you type in Listing 1 and save it to disk, you must set high memory before loading and running Endgame. To do so, re-enter Basic, typing in

45,000 at the memory size prompt.

When you load and run Endgame, it issues a series of prompts:

Order of Battle?
Target Priorities?
Engagement Range?
Max. Game Time?
How Many Replications?
How Many Event Histories?
Will You Want Hard Copy?

If you respond to each prompt by pressing the enter key, Endgame simulates a default game. The first two prompts require fairly detailed inputs if

your response is anything except pressing the enter key or typing in N; the other prompts require only a single entry.

"Order of battle" is military jargon for the number and types of units in the opposing forces. The default gives Red and Blue identical forces: 12 fighting vehicles, three each of the four weapons types described above.

If you want a different order of battle, type in Y and the program prompts you for the total number of elements on each side and also for the number of each type. The program doesn't check for contradictory input, so if you

TANDY-COMPATIBLE SIMULATIONS

Compiled by Dave Rowell

Bank President

Business management simulation that you can play as one or several bank CEOs. Simulates four bank types. Tandy 1000/1200 (128K, one drive). Machine language. \$74.95. Lewis Lee Corp., P.O. Box 51831, Palo Alto, CA 94303. 415-853-1220.

Chemical Engineering Simulation (Microchess)

Generates steady-state heat and material balances for industrial chemical processes. Allows a large number of equipment and reaction setups. Tandy 1200 and 2000 (256K, Intel math coprocessor). Compiled Basic or Fortran. \$2,300. COADE, 8552 Katy Freeway, Suite 320, Houston, TX 77024. 713-973-9060.

Flight Simulator

Sublogic's classic, licensed to Microsoft. This is the version that almost qualifies as flight trainer. Simulates single-engine plane and many U.S. airports, plus a World War I biplane fighter. Tandy 1000/1200 (128K, one drive). Machine language, \$49.95 Microsoft, 10700 Northrup Way, Bellevue, WA 98004. 206-828-8088.

Forest Fire Dispatcher

Simulates the responsibilities of a forest fire dispatcher in southeast Kentucky. Allocate money and resources to minimize forest fire damage within budget constraints. (More educational than game.)

Models I and III (32K disk, 16K cassette). Basic with machine-language subroutines. Disk: \$29.50. Cassette: \$24.95 Sublogic Communications Corp., 713 Edgebrook Drive, Champaign, IL 61820. 217-359-8482.

Microcosm

Population biology of microbes; a game of life where you can modify the rules of interaction including mutation. Tandy 1000/(128K, one drive, DOS KEYCNVRT.SYS driver). GW-Basic with machine-language subroutines. \$39.95. Aeon Concepts, Computer Products Division, 1657 Red Mill, Pittsburgh, PA 15241. 412-831-5352.

Millionaire: The Stock Market Simulation

Tycoon: The Commodity Market Simulation

Baron: The Real Estate Simulation

Squire: The Financial Planning Simulation

Realistic business simulations you can play as games. Tandy 1000/1200 (128). \$59.95 (Squire is \$69.95). Blue Chip Software, 6744 Eton Ave., Canoga Park, CA 91303. 818-346-0730.

Monte Carlo Simulation

Business program uses Monte Carlo technique to forecast trends from past data or events. (Several other programs available from this company use similar methods for a variety of purposes.) Models III, 4 (with CP/M), and 1000/1200. Compiled Basic. Disk: \$125. Lionheart, P.O.

Box 379, Alburg, VT 05440. 514-933-4918.

Population Dynamics

Two ecological simulations, one with intraspecies individuals competing for food and other limited resources, the other pits two species against each other. You control conditions of competition. Model III (32K). Basic. Disk: \$45. Queue Inc., 5 Chapel Hill Drive, Fairfield, CT 06432. 203-335-0906.

Supreme Ruler Plus

Economic simulation. Game modeled on past performance of U.S. economy. Models I and III (48K). Basic. Cassette or disk: \$26.50. JMG Software International, 710 Upper James St., Hamilton, Ontario L9C 2Z8, Canada. 416-389-6086.

T80-FS1 Flight Simulator

Simulates flight of small plane. Shows view from cockpit. Models I and III (16K). Machine language. Cassette: \$25; enhanced disk version: \$33.50. Sublogic Communications Corp., 713 Edgebrook Drive, Champaign, IL 61820. 217-359-8482.

TModel—Transportation Modeling System

For land-use planning. Analyzes hourly traffic volumes of existing or planned road networks. Tandy 1000/1200 (128K, one drive). Compiled Basic. \$1,200. Professional Solutions Inc., 3765 N.W. 173rd Place, Beaverton, OR 97006. 503-645-4422.

P
S

ATTENTION MODEL 4 OWNERS

(soon also available in MS-DOS!)

When You Bought Your Computer, Did You Want It To:

KEEP records of a stock/option portfolio with automatic calculation and documentation of profit/loss and tax consequences, as well as profit projections and analysis?

PREPARE a printed readout of your whole year's income tax totals in up to 16 categories in less than six minutes?

REMIND you of all appointments for the year, including automatic memory of quarterly or annual events, such as anniversaries, dividend dates, etc.?

PROVIDE a telephone directory which includes a personal "yellow pages" and automatic mailing list?

MAINTAIN an inventory of household or other goods for insurance or other purposes?

OFFER you financial projection programs such as compound interest and mortgage amortization schedules?

BUT WERE YOU DISAPPOINTED WHEN...

No single piece of software would do all that?

You had to make multiple entries of the same data?

You found out that data files of different programs were incompatible?

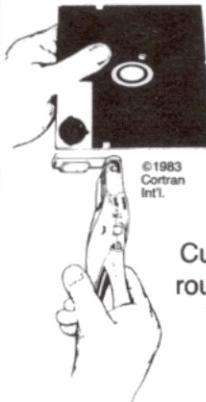
Practical Software's Money Organizer Program, developed by people who share your needs, solves all these problems and more!

For a free 8 page Comprehensive Brochure:

**PRACTICAL
SOFTWARE**

186 Murray Drive
Aurora, Ontario
Canada L4G 2C5
or call
416-727-4747

DOUBLES DISKETTE CAPACITY! CUTS YOUR DISK COST 50%!



©1983
Cortron
Int'l.

Now! The back of 5 1/4" Diskettes can be used for data storage even with single head disk drives.

- **NIBBLE NOTCH®** Tools make it easy.
- Adds the Precise notch where it's needed.
- Doubles Diskette Space or Money Back!

NIBBLE NOTCH II

Cuts square notch and 1/4" inch round "index hole." For use with

TRS 80 I and III, Osborne,
Kaypro, IBM and others
needing an "index hole."

\$21.90

add \$2.00 each order P&H
(\$5.00 foreign P&H)

Florida residents add 5% Sales Tax

SATISFACTION GUARANTEED OR YOUR MONEY BACK!

ORDER TODAY!

Toll Free 1-800-642-2536

Florida 305-493-8355

or send Check or Money Order to:

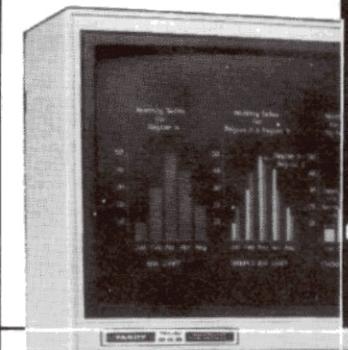


NIBBLE NOTCH® COMPUTER PRODUCTS
4211 NW 75th TERRACE • DEPT. 20 • LAUDERHILL, FL 33319

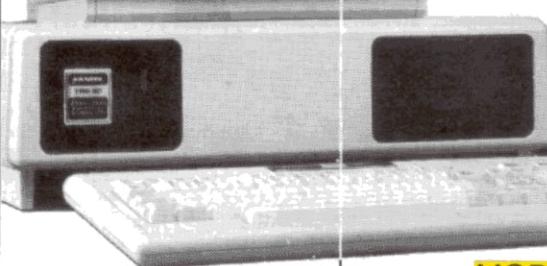
TRS-80®

CHECK OUR PRICES

ALWAYS AT
SALE PRICES
WITH MANUFACTURERS
WARRANTY (IN USA).



MODEL 4



MODEL 2000

CALL TOLL FREE
To get YOUR
SALE PRICE-DIAL

1-800-433-SALE

(9am - 5pm C.S.T.)

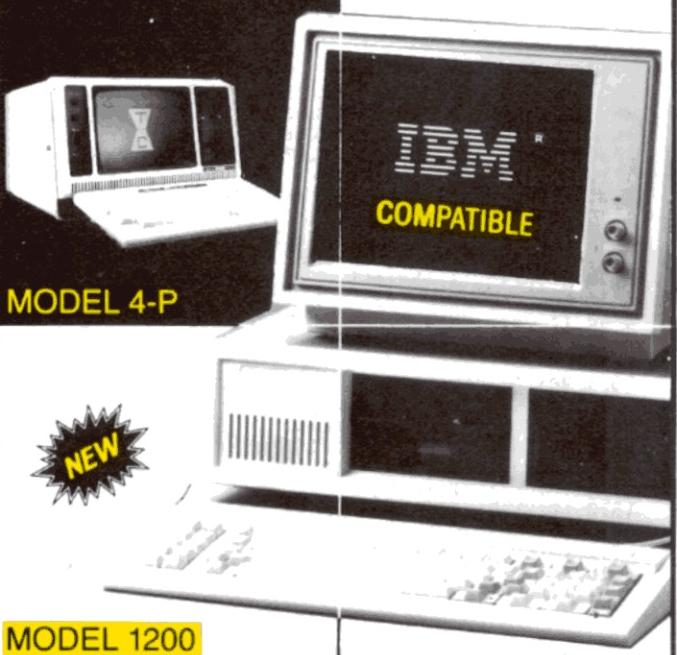


**WE SHIP
FAST!**

DFW COMPUTER CENTER
326 MAIN ST., GRAPEVINE
TEXAS 76051 (817)481-7283



® REGD: TANDY CORPORATION



MODEL 1200

```

1090 NEXT J:NEXT I:IC(LX)=JT+JL(L)+INT(RND(.1)*KL)+1:POKE LO,3:RET
URN
1100 IF IL(LZ)=0 THEN IC(LX)=JT+INT(RND(.1)*KL)+1:KX=0:POKE LO,I1:
RETURN
1110 JD=ABS(PEEK(JC+LX)-PEEK(JC+LZ)):POKE LO,4
1120 KD=ABS(PEEK(KC+LX)-PEEK(KC+LZ)):IM=1
1130 M=PEEK(JR+((JD-1)*I0)+KD):IC(LX)=JT+(M*1800)/IV(L)
1140 K=(IX-1)*I4+L:MF(K)=MF(K)+1:IR(LX)=M:RETURN
1150 IF IL(LX)=0 THEN IC(LX)=IT ELSE IC(LX)=JT+JL(L)+INT(RND(.1)*K
L)+1
1160 IF IL(LZ)=0 THEN IC(LX)=JT+INT(RND(.1)*KL)+1:KX=0:POKE LO,1:R
ETURN
1170 M=IR(LX):N=(M-1)*I6+(L-1)*I4+LT(LZ):POKE LO,3
1180 IJ=1:IF (INT(RND(.1)*MM)+1)>PEEK(IH+N) THEN RETURN
1190 IJ=2:IF (INT(RND(.1)*MM)+1)>PEEK(IK+N) THEN RETURN
1200 IL(LZ)=0:IF PEEK(IO+LZ)<I4 THEN POKE IO+LZ,1:IC(LZ)=IT
1210 IJ=3:IF LT(LZ)=4 THEN IC(LZ)=IT:POKE IO+LZ,1
1220 N=(IX-1)*I6+(L-1)*4+LT(LZ):MX(N)=MX(N)+1:POKE LO,I1
1225 IF IL(LX)<1 THEN IC(LX)=IT ELSE IC(LX)=JT+INT(RND(.1)*KL)+1
1230 RETURN
1240 KJ=USR1(VARPTR(IC(1)))
1250 IZ=3-IX:LZ=IG(LX):L=LT(LX):IJ=0:LO=LX+IO:IM=0
1280 IF JT>KG THEN 1240
1290 IF KX<5 THEN 1330
1300 IF JT=>IT THEN JT=KG
1310 GOSUB 1660 :IF KF=1 THEN RETURN
1320 GOSUB 1580 :GOTO 1240
1330 ON KX GOSUB 1020 ,1040 ,1100 ,1150
1340 IF KX=0 THEN 1240
1350 IF KX=4 AND IJ=0 THEN 1240
1360 IF KX=3 AND IM=0 THEN 1240
1370 IF KX<5 THEN 1410
1380 IF JT=>IT THEN JT=KG
1390 GOSUB 1660 :IF KF=1 THEN RETURN
1400 GOSUB 1580 :GOTO 1240
1410 IF IW<I1 THEN 1240 ELSE JZ=LZ+(IX-1)*NP(1)
1420 IF JH=1 THEN LPRINT USING FS;JT/IS,:LPRINT S$(IX);JX,
1430 PRINT USING FS;JT/IS,:PRINT S$(IX);JX,
1440 IF KX<>I1 THEN 1470
1450 IF JH=1 THEN LPRINT "Initiates Search"
1460 PRINT "Initiates Search":GOTO 1240
1470 IF KX<>I2 THEN 1500
1480 IF JH=I1 THEN LPRINT "Targets ";S$(IZ);JZ
1490 PRINT "Targets ";S$(IZ);JZ:GOTO 1240
1500 IF KX>I3 THEN 1550
1510 IF JH=1 THEN LPRINT "Fires at ";S$(IZ);JZ;
1520 IF JH=1 THEN LPRINT "Range";IR(LX)*100+JB(LX)+JB(LZ)
1530 PRINT "Fires at ";S$(IZ);JZ;" Range";
1540 PRINT IR(LX)*100+JB(LX)+JB(LZ):GOTO 1240
1550 IF JH<1 THEN 1570
1560 LPRINT " vs ";S$(IZ);JZ;" Assess ";RS(IJ)
1570 PRINT " vs ";S$(IZ);JZ;" Assess ";RS(IJ):GOTO 1240
1580 J5=IO:NT=NP(1)+NP(2):FOR I=1 TO NT:IC(I)=INT(RND(.1)*36)+1
1590 J5=J5+1:POKE J5,1
1600 IL(I)=1:NEXT I:PRINT "Replication #";NX+1
1610 IF JH<1 THEN RETURN ELSE IF IW<1 THEN RETURN
1620 LPRINT CHR$(12)
1630 LPRINT "Event History, Replication # ";NX+1
1640 LPRINT "
1650 RETURN
1660 NX=NX+1:KF=0:IF NX=NE THEN KF=1:CLS:PRINT@272,L$;
1670 MJ=0:MK=0:IF KF=1 THEN GOSUB 4180
1680 FOR I=1 TO 32:ZL(I)=ZL(I)+MX(I):QL(I)=QL(I)+MX(I)[2
1690 IF I<17 THEN MK=MK+MX(I) ELSE MJ=MJ+MX(I)
1700 IF KF=1 THEN GOSUB 4180
1710 MX(I)=0:NEXT I:IW=IW-1
1720 TB=TB+MJ:QB=QB+MJ[2:TR=TR+MK:QR=QR+MK[2
1730 GT=GT+JT/IS:QT=QT+(JT/IS)[2
1740 FOR I=1 TO 8:ZF(I)=2F(I)+MF(I)
1750 IF KF=1 THEN GOSUB 4180
1760 QF(I)=QF(I)+MF(I)[2:MF(I)=0:NEXT I
1770 IF KF=0 THEN RETURN ELSE MS=PP$:GOSUB 4180
1780 IF JH>0 THEN LPRINT CHR$(12)
1790 ZE=NE:GT=GT/ZE:QT=(QT/ZE)-GT[2
1800 TB=TB/ZE:TR=TR/ZE:VB=(QB/ZE)-TB[2
1810 VR=(QR/ZE)-TR[2:IF VR<EPS THEN VR=0
1820 IF VB< EPS THEN VB=0
1830 VB=SQR(VB):VR=SQR(VR)
1840 GOSUB 4180 :IF QT<EPS THEN QT=0
1850 QT=SQR(QT):FOR I=1 TO 32:GOSUB 4180
1860 V=(QL(I)/ZE)-(ZL(I)/ZE)[2:IF V<EPS THEN V=0
1870 ZL(I)=ZL(I)/ZE:QL(I)=SQR(V*(ZE/(ZE-1))):NEXT I
1880 FOR I=1 TO 8:GOSUB 4180
1890 V=(QF(I)/ZE)-(ZF(I)/ZE)[2:IF V<EPS THEN V=0
1900 ZF(I)=ZF(I)/ZE:QF(I)=SQR(V*(ZE/(ZE-1))):NEXT I

```



specify a total Blue force of 30 elements and also specify 16 heavy tanks and 18 armored personnel carriers, you're in for a sick, sick simulation.

The maximum number of total elements in a game is 60; the only restriction on Red or Blue force sizes is that their sum can't exceed 60.

Blue's default target priorities are, from highest to lowest, Red type 4, type 3, type 2, and type 1. Red's default target priorities are Blue type 1, type 2, type 3, and type 4.

If you specify different target priorities, the program prompts you for 32 inputs: first through fourth Red target priorities for each of four Blue weapon types, and Blue target priorities for each Red weapon type.

The default engagement range value is 500 meters. You can specify values from 100–2,500 meters. When the program assigns coordinates to weapons, it puts the first element in a force in the southernmost square, the next in the square immediately to the north, and so on. If the force has more than 10 elements, the program recycles to the southernmost square.

With a nominal engagement range of, say, 500 meters, some of the actual element-to-element engagement ranges may well be more than 1,000 meters.

The default game time is 60 seconds. When you run the program, you'll see that a lot can happen in 60 seconds. Endgame thinks of infinity as 1,800 seconds, a half-hour.

You're free to select any game time within this infinity, but a word of caution: A long game time can combine with a long target-detect time to overflow an event clock and blow up the program, because detect time uses an exponential distribution.

The default number of replications is 12. You shouldn't specify fewer than two replications; otherwise, the program bombs in the postprocessor, since it uses the $N - 1$ statistic to calculate variance.

A CURE FOR THE COMMON CODE

AT LAST, YOU DON'T HAVE TO BE A PROGRAMMER
TO ACT LIKE ONE!

The ACT III authoring system allows you to create courseware for any kind of training or instructional purpose. It is a *free-form* system that enables tutorials, simulations, drill, or any other learning format software to be developed with unmatched speed and power, whether you are an absolute novice, or an experienced Z-80 programmer.

ACT III supports and facilitates the use of hundreds of CAI options, including, but not limited to...

EXTENSIVE PERSONALIZATION, UNLIMITED BRANCHING, 100 TEXT AND GRAPHIC DISPLAY OPTIONS, CLOZE PROCESSING, AUDIO AND TIMING CONTROLS, COUNTERS, DETAILED ANSWER ANALYSIS, HINTS, ALTERNATIVE ANSWERS, PRINT FUNCTIONS, LESSON REPORTS, ANIMATION, READABILITY MEASURES, STUDENT MESSAGES, SYNTAX CHECKING, SPECIAL PROMPTS, AND DOZENS MORE...

ACT III can be purchased through this ad for \$399, and allows you to simulate the function of most any other educational courseware. It contains a full functioning word processor and lesson generator, a display program, a screen artist program for special graphics, a mini data based manager, a syntax checker and a menu generator, all fully integrated for fast, easy use.

We developed this program over a three year period using professional educators and professional programmers together, and have field tested under diverse learning environments ranging in every discipline, kindergarten through post-graduate. We're sure it can meet your needs as well.

ACT III is available for the TRS-80 models III and IV. It comes with the program diskette and backup, data base diskette, tutorial and sample lesson diskette, 300 page user's manual in a stand-up binder, quick reference card, and all the support you need. You also get our 30 day, no-hassle, money back guarantee. Send for ACT III today!

Please Send ACT III right away.
My check or P.O. is enclosed.

Name: _____
Address: _____
City: _____
State: _____ Zip: _____
Hartford, CT 06103

See our review in the April, '85, 80 Micro or send \$1.00
for our complete product information package.



Circle 85 on Reader Service card.

CONVERT MOD III BASIC MOD 4 IBM PC TANDY 2000

If you own a TRS-80 Mod III and have resisted upgrading to the TRS-80 Mod 4, IBM PC, or Tandy 2000 because your software would not be compatible, good news has finally arrived. EMSI offers 3 powerful utilities for converting your Mod III BASIC programs to run on any of these new machines.

The programs are menu driven, very easy to use and automatically translate 95% or more of even your largest BASIC programs in just a few minutes. They insert all required spaces between keywords, recalculate PRINT@ addresses (or replace them with LOCATEs), adjust TAB addresses, correct exponentiation symbols, eliminate unnecessary spaces, remove down arrows, optionally remove REM's, and flag and list unresolved line numbers. User guides explain program operation in complete detail, offer alternatives for revising lines that need manual intervention and numerous hints for easier, more thorough conversions.

CONV3TO4 Converts TRS-80 Mod III BASIC to TRS-80 Mod 4 \$ 49.95

Hundreds of satisfied users. Ask to see program review (three stars) at your local Radio Shack Computer Center.

CONV3TOPC NEW! Converts TRS-80 Mod III BASIC to IBM PC* \$139.95

CONV3TO2000 NEW! Converts TRS-80 Mod III BASIC to Tandy 2000* \$139.95

*Includes convenient diskette formatter and file transfer program so that programs and files may be exchanged between machines without modems. Diskettes and guides are packaged in deluxe three ring binders. User Guides available separately for those who want complete details before ordering entire package (\$5.00 cash or MO only, credited to subsequent package order).

TO ORDER, CALL NOW — TOLL FREE (Except NJ)
800-922-0786

NJ residents, and local dealers: 201-879-5982

EDUCATIONAL MICRO SYSTEMS, Inc.

P.O. Box 471, Chester, New Jersey 07930

DEALER INQUIRIES INVITED

Terms: VISA, Mastercard, MO, check, or COD. Orders shipped within 24 hrs. Add \$3.00 shipping/handling. Add \$1.65 for COD. Foreign or first class, add first class postage (package wt. 2 1/4 lbs.). NJ residents add 6% sales tax.

EXPAND TRS-80 MEMORY

TRS-80 to 16K, 32K, or 48K

**Model 1 = From 4K-16K Requires (1) One Kit
Model 3 = From 4K-48K Requires (3) Three Kits
Color = From 4K-16K Requires (1) Kit

**Model 1 equipped with Expansion Board up to 48K Two Kits Required
— One Kit Required for each 16K of Expansion —

Compare Our Prices!!

TRS-16K3 200ns for Color & Model III. . . . \$6.29
TRS-16K4 250ns for Model I. . . . \$5.49

TRS-80 Color 32K or 64K Conversion Kit

Easy to install kits come complete with 8 ea. 4164-2 (200ns) 64K dynamic RAMs and conversion documentation. Converts TRS-80 color computers with D, E, ET, F and NC circuit boards to 32K. Also converts TRS-80 color computer II to 64K. Flex DOS or OS-9 required to utilize full 64K RAM on all computers.

TRS-64K2. \$29.95

NEW! TRS-80 Model IV 64K or 128K Conversion Kit

Easy to install kit comes complete with 8 each 4164 (200ns) 64K dynamic RAMs and conversion documentation. Converts TRS-80 Model IV computers from 16K to 64K. Also expands Model 4P from 64K to 128K.

TRS-64K2. \$29.95
(Converts the Model IV from 16K to 64K or will expand the Model 4P from 64K to 128K)

TRS-64K2PAL (Model IV only). \$49.95
(8-4164's with PAL Chip to expand from 64K to 128K)

DISK DRIVES AND ENCLOSURES

MPI51S	MPI 5 1/4" SS/DD full height bare disk drive. . . . \$89.95
DDE-1FH	5 1/4" Disk Drive Enclosure w/power supply. . . . \$69.95
TRS-SPECIAL	MPI51S and DDE-1FH (above). \$149.95

ULTRA MAGNETICS 5 1/4" DISKETTES

SSDD=Single Sided Double Density - DSDD=Double Sided Double Density

Part No.	Description	Boxed	Price
UM51401	SSDD with Hub Ring	10	\$17.95
UM52401	DSDD with Hub Ring	10	\$22.95

All diskettes are soft-sectored w/hub rings. Bulk prices available on request.

RID Disk Drive Analyzer
Accommodates TRS-80 Model III, IV & 4P
Evaluates 7 critical steps. \$37.95

DISK MINDER
5S1-3

• Attractive, functional disk storage system • 36 (3", 3.25" and 3.5"), 50 (8") or 75 (5 1/4") disk storage capacity • Easy filing and retrieving • Protects disk from dust contamination • Molded from durable smoked plastic with front carrying handle • Size (DM36): 8 1/8" L x 5 1/2" W x 4 1/4" D • Size (DM50 & DM75): 7" W x 6 1/2" H x 9 1/4" D • Weight: 2 lbs.

Part No. **Description** **Price**

DM36	Stores 36 (3", 3.25" and 3.5") Diskettes. \$19.95 ea.
DM75	Stores 75 (5 1/4") Diskettes. \$19.95 ea.
DM50	Stores 50 (8") Diskettes. \$29.95 ea.

We also specialize in integrated circuits, custom cables, power supplies, keyboards, and much, much more!
Give us a call today!

PROTECT YOURSELF..
DATASHIELD® Surge Protector

Eliminates voltage spikes and EMI-RFI noise before it can damage your equipment or cause data loss. 6-mo. warranty. Power dissipation (100 microseconds): 2,000,000 watts

PART NO. **DESCRIPTION** **PRICE**

MODEL 75	4 Sockets, On/Off Switch. \$49.95
MODEL 85	6 Sockets, Super Filters, On/Off Switch. \$59.95
MODEL 100	6 Sockets, Super Filters, Low Voltage Alarm. \$69.95
MODEL 110AMS	6 Sockets, Super Filters, Auto. Master Switch. \$99.95

DATA SHIELD® BACK-UP POWER SOURCE also available. Protect your Tandy computer from black-outs, brown-outs, power surges and line noise.

PC200 (200 Watt Rating). \$299.95
XT300 (300 Watt Rating). \$399.95
AT800 (800 Watt Rating). \$799.95

\$10.00 Minimum Order — U.S. Funds Only
California Residents Add 6 1/2% Sales Tax
Shipping — Add 5% plus \$1.50 Insurance
Send S.A.S.E. for Monthly Sales Flyer!

Spec Sheets — 30¢ each
Send \$1.00 Postage for your
FREE 1985 JAMECO CATALOG
Prices Subject to Change



Mail Order Electronics Worldwide
1355 SHOREWAY ROAD, BELMONT, CA 94002
Phone Orders Welcome (415) 592-8097 Telex: 176043

Listing 1 continued

```

1910 CLS:PRINT"OUTPUT SUMMARY FOR ";NE;" REPLICATIONS
1920 IF JH>0 THEN LPRINT"OUTPUT SUMMARY FOR ";NE;"REPLICATIONS"
1930 PRINT:IF JH>0 THEN LPRINT" "
1940 PRINT"ELAPSED TIME (Sec.) = ";
1950 PRINT USING FO$;GT;:PRINT USING FP$;QT
1960 IF JH<1 THEN 1990
1970 LPRINT"ELAPSED TIME (Sec.) = ";
1980 LPRINT USING FO$;GT;:LPRINT USING FP$;QT
1990 PRINT:IF JH>0 THEN LPRINT" "
2000 PRINT"TOTAL LOSSES"
2010 IF JH>0 THEN LPRINT "TOTAL LOSSES":LPRINT" "

```

Listing 1 continued

```

T = 25.94 Seconds:Blue 2 vs Red 1 Assess KILL
T = 26.06 Seconds:Blue 8 Initiates Search
T = 26.11 Seconds:Blue 10 Fires at Red 7 Range 483
T = 26.39 Seconds:Blue 4 Initiates Search
T = 26.44 Seconds:Blue 1 Fires at Red 4 Range 731
T = 26.56 Seconds:Red 3 Targets Blue 11
T = 26.89 Seconds:Red 5 Targets Blue 11
T = 26.94 Seconds:Blue 5 Fires at Red 4 Range 518
T = 27.11 Seconds:Red 11 Fires at Blue 6 Range 632
T = 27.28 Seconds:Blue 1 vs Red 4 Assess MISS
T = 27.33 Seconds:Red 18 Targets Blue 11
T = 27.39 Seconds:Blue 6 Initiates Search
T = 27.83 Seconds:Red 11 vs Blue 6 Assess MISS
T = 27.94 Seconds:Red 8 Targets Blue 1
T = 28.22 Seconds:Blue 1 Fires at Red 4 Range 731

```

Photo. An Endgame event history.

```

OUTPUT SUMMARY FOR 12 REPLICATIONS
ELAPSED TIME (Sec.) = 60.63( 0.56)
TOTAL LOSSES
Blue: 6.58( 1.19)
Red: 6.75( 0.92)

ROUNDS FIRED
          Blue           Red
Type 1    1.25( 0.87)    5.92( 1.88)
Type 2    3.08( 1.44)    5.17( 1.88)
Type 3    5.50( 2.11)    2.08( 1.56)
Type 4    6.58( 1.78)    1.17( 0.72)

```

Figure 1. Screen dump of Endgame's output summary.

KILLER/VICTIM MATRIX

Blue Weapons		Red Targets			
Type	Serial ID	Type	Serial ID	Type	Serial ID
TYPE 1	0.00(0.00)	TYPE 2	0.00(0.00)	TYPE 3	0.00(0.29)
TYPE 2	0.00(0.00)	TYPE 4	0.83(0.72)	TYPE 1	0.00(0.29)
TYPE 3	0.00(0.00)	TYPE 2	0.75(0.75)	TYPE 3	1.00(0.51)
TYPE 4	0.00(0.00)	TYPE 3	0.17(0.39)	TYPE 4	0.58(0.67)
		Blue Targets		Red Targets	
Red Weapons	TYPE 1	TYPE 2	TYPE 3	TYPE 4	
TYPE 1	1.00(0.85)	1.75(0.75)	0.33(0.49)	0.00(0.00)	
TYPE 2	1.42(1.08)	0.75(0.97)	0.33(0.65)	0.00(0.00)	
TYPE 3	0.42(0.67)	0.33(0.49)	0.08(0.29)	0.00(0.00)	
TYPE 4	0.17(0.39)	0.00(0.00)	0.00(0.00)	0.00(0.00)	

Figure 2. Screen dump of Endgame's killer/victim matrix.



Generally, the more replications you run, the more stable your output.

The event history is a screen text display of every event in the battle as it happens (see the Photo). The default value is 1; so, in the default simulation, you'll see an event history on the screen for the first cycle only. A replication runs slightly faster if you don't call for an event history. You can specify any number of event histories up to the number of replications you select.

If you answer the hard copy prompt by pressing the enter key or by typing in N, you'll get no printout. Any other response produces a screen dump.

Once you've answered the prompts, the program displays a summary of your inputs. If you're ready to start the simulation, press the enter key; if you press any other key, the program returns you to the beginning of the input prompts for changes.

After the input, the program displays the order of battle. The value on the left is an individual weapon's serial identification (ID) within its force; in the event history, "Blue 6" or "Red 9" refers to this serial ID. The number in parentheses is the weapon's type, and the four numbers to the right show the weapon's target priorities.

The program now begins preprocessing, which takes about five minutes if your computer runs a 2 MHz clock, and about half that at 4 MHz.

After preprocessing, the actual simulation begins. If you specify one or more event histories, a running account of the battle appears on the screen.

Endgame runs the specified number of replications and prepares a statistical analysis. After a minute or two of post-processing, the screen displays the number of rounds fired and the number of killed for each side (see Fig. 1). When you continue to the next page, you'll see the killer/victim matrix, a weapon-by-weapon breakdown of the simulation's results (see Fig. 2).

The clock scan alternates between first Blue weapon to last Red and last Red to first Blue. This alternating scan direction avoids bias.

The first statistic in each category is the mean value for all repetitions. The second, shown in parentheses, is the standard deviation, which measures the outcomes' spread.

After viewing this data, you can return to the input routine. This time, the default game is the one you specified previously. On repeat runs, Endgame does not go through preprocessing.

The Game Loops

In execution, Endgame is a monotonous loop. The program repeatedly scans the array containing event clocks for each weapon to find the low clock, which is associated with an event code specifying one of the model's five critical events. Endgame then calls a routine to execute this event, loads new values into event codes and event clocks if necessary, and scans the event clocks again.

This loop continues until the event code indicates an end of battle, at which point the program calls the output processing routine to store pertinent data from this cycle, restores initial battle conditions, and goes back to the idiot loop of scanning, processing, loading, scanning, and so on.

The preprocessing and postprocessing routines are vital parts of the program, but they probably won't make sense until you know what goes on in the inner game loops. So I'll start my discussion of the program in the middle and work from there toward the beginning and the end.

The main routine, lines 2580-2660, dimensions a few variables and begins calling subroutines. I'll pick up the action where the program calls the subroutine at line 1240.

Since line 1240 calls the Event Clock Scan routine (see Listing 2), I'll briefly explain what's going on up there in high memory. The routine scans the event clocks and selects the low clock.

The routine knows the number of Blue weapons in the battle (NB), the

Listing 1 continued

```

2020 PRINT S$(1);":":PRINT USING PO$;TB;
2030 PRINT USING PP$;VB
2040 IF JH<1 THEN 2070
2050 LPRINT S$(1);":":LPRINT USING PO$;TB;
2060 LPRINT USING PP$;VB
2070 PRINT S$(2);":":PRINT USING PO$;TR;
2080 PRINT USING PP$;VR
2090 IF JH<1 THEN 2120
2100 LPRINT S$(2);":":LPRINT USING PO$;TR;
2110 LPRINT USING PP$;VR:LPRINT" "LPRINT"
2120 PRINT:PRINT"ROUNDS FIRED"
2130 IF JH>0 THEN LPRINT"ROUNDS FIRED":LPRINT" "
2140 A$=" Blue Red"
2150 PRINT A$:IF JH>0 THEN LPRINT A$:LPRINT" "
2160 FOR I=1 TO 4:PRINT"Type ";I;" ";
2170 IF JH>0 THEN LPRINT"Type ";I;" ";
2180 PRINT USING PO$;ZF(I):PRINT USING PP$;QF(I);
2190 PRINT" ";
2200 IF JH<1 THEN 2230
2210 LPRINT USING PO$;ZF(I);
2220 LPRINT USING PP$;QF(I):LPRINT" ";
2230 PRINT USING PO$;ZF(I+4);
2240 PRINT USING PP$;QF(I+4)
2250 IF JH<1 THEN 2280
2260 LPRINT USING PO$;ZF(I+4);
2270 LPRINT USING PP$;QF(I+4)
2280 NEXT I:PRINT"Press <ENTER> to Continue"
2290 G$=INKEY$:IF G$="" THEN 2290
2300 A$="KILLER/VICTIM MATRIX"
2310 REM:PRINT A$
2320 IF JH>0 THEN LPRINT" "LPRINT" "LPRINT A$:LPRINT" "
2330 CLS:PRINT CHR$(23):PRINT@524,"KILLER/VICTIM MATRIX"
2340 FOR L=1 TO 300:NEXT L:CLS
2350 FOR I=1 TO 2:IZ=3-I:PRINT
2360 A$=" "+$$(I)+" "+$$(IZ)+" Targets"
2370 PRINT A$:IF JH>0 THEN LPRINT A$ TYPE 3 TYPE 2 TYPE 4
2380 A$="Weapons TYPE 1 TYPE 2 TYPE 3 TYPE 4"
2390 PRINT A$:IF JH>0 THEN LPRINT A$ TYPE 3 TYPE 2 TYPE 4
2400 REM:IF JH>0 THEN LPRINT A$:LPRINT"Weapons";
2410 FOR J=1 TO 4
2420 IF JH>0 THEN LPRINT"TYPE";J,
2430 L=(J-1)*4+(I-1)*16:PRINT"TYPE";J,:FOR K=1 TO 4:L=L+1
2440 PRINT" " :PRINT USING PO$;ZL(L);:PRINT USING PP$;QL(L);
2450 IF JH>0 THEN LPRINT" " :LPRINT USING PO$;ZL(L);
2460 IF JH>0 THEN LPRINT USING PP$;QL(L);
2470 NEXT K:PRINT:IF JH>0 THEN LPRINT" "
2480 NEXT J
2490 IF JH>0 THEN LPRINT" "
2500 NEXT I
2510 PRINT"Press <ENTER> to continue"
2520 G$=INKEY$:IF G$="" THEN 2520
2530 CLS:RETURN
2540 FOR I=1 TO 32:ZL(I)=0:QL(I)=0:MX(I)=0:NEXT I
2550 NX=0:TB=0:TR=0:QB=0:QR=0:TM=0:TV=0:GT=0:QT=0
2560 FOR I=1 TO 8:ZF(I)=0:QF(I)=0:MF(I)=0:NEXT I
2570 RETURN
2580 DIM IC(61),LT(60),LP(32),KD(4),MX(32),MF(8),IL(60)
2590 DIM JB(60),NP(2),IP(32),IR(60),IG(60)
2600 DIM ZL(32),QL(32),ZF(8),QF(8),PZ(16),P1(16)
2610 DIM S$(2),NI(10),PA(4),DT(4),XM(4),PV(4)
2620 CLS:GOSUB 2670 :GOSUB 3020 :PRINT@272,L$,:GOSUB 3780
2630 GOSUB 4210
2640 KJ=USR(VARPTR(IX)):GOSUB 1580
2650 POKE MB,NB:POKE MR,NR:POKE MT,NT
2660 GOSUB 1240 :GOSUB 2540 :GOSUB 3020 :GOSUB 1580 :GOTO 2660
2670 IX=0:JX=0:KX=0:LX=0:JY=0
2680 PI=3.14159:TP=2*PI:S$(1)="Blue":S$(2)="Red"
2690 W$(1)="First":W$(2)="Second":W$(3)="Third"
2700 W$(4)="Fourth":RS(1)="MISS":RS(2)="HIT":E$=CHR$(13)
2710 RS(3)="KILL":MM=255:IS=18:IT=32400:KL=IS
2720 DATA 4,3,2,1,4,3,2,1,4,3,2,1,4,3,2,1:'Blue
2730 DATA 1,2,3,1,2,3,4,1,2,3,4,1,2,3,4,1:'Red
2740 FOR I=1 TO 32:READ LP(I):NEXT I:KG=1000
2750 NP(1)=12:NP(2)=12:NB=NP(1):NR=NP(2):NT=NB+NR
2760 DATA 1,1,1,2,2,2,3,3,3,4,4,4:'Blue OB
2770 DATA 1,1,1,2,2,2,3,3,3,4,4,4:'Red OB
2780 FOR I=1 TO NT:READ LT(I):NEXT I:BL$=
2790 KO=1:LJ=5:NE=12:IW=1:PR$="PREPROCESSING":GG$=CHR$(13)
2800 FOS="#.#.#":PP$="#.#.#":FS="T =##.#.## Seconds:"
2810 DEF USR#=&HB0000:DEF USRL=&HB00D:PP$="POSTPROCESSING"
2820 JR=&HB5D8-1:IR=&HB4D9-1:IH=&HB119-1:IK=&HB2F9-1
2830 IO=&HB0DD-1:MB=&HB0DB:MR=&HB0DC:MT=&HB0D8
2840 JC=&HB6D2-1:NB=NP(1):NR=NP(2):NT=NB+NR:KC=JC+60
2850 IL=1:I2=2:I3=3:I4=4:I0=10:I6=16:JF=0
2860 L$="":FOR I=1 TO 3:FOR J=1 TO 34

```

Listing 1 continued

```

2870 READ K;L$=L$+CHR$(K):NEXT J
2880 IF I<3 THEN L$=L$+STRING$(34,24)+CHR$(26)
2890 NEXT I:CLS
2900 DATA 191,131,131,131,128,191,164,128,191,128
2910 DATA 191,131,131,169,128,190,131,131,131,128
2920 DATA 128,182,185,128,128,191,164,152,191,128
2930 DATA 191,131,131,131,191,148,128,128,128,191
2940 DATA 128,137,191,128,191,128,128,170,128,191
2950 DATA 128,128,128,128,191,128,128,191,128,191
2960 DATA 128,128,191,128,191,148,128,128,191,176
2970 DATA 176,176,128,191,128,128,191,128,191,176
2980 DATA 176,154,128,175,176,176,187,128,191,128
2990 DATA 128,191,128,191,128,128,191,128,191,176
3000 DATA 176,176
3010 RETURN
3020 N$="N":INPUT"Order of Battle";NS:IF NS$="N" OR NS$=CHR$(110) OR
NS$="" THEN 3090
3030 N=0:FOR K=1 TO 2:PRINT "How many ";S$(K);:INPUT NP(K)
3040 FOR J=1 TO 4:PRINT"How many type ";J;:INPUT M
3050 IF M=0 THEN 3070
3060 FOR L=1 TO M:N=N+1:LT(N)=J:NEXT L
3070 NEXT J:NEXT K:NB=NP(1):NR=NP(2):NT=NB+NR
3080 POKE MB,NB:POKE MR,NR:POKE MT,NT
3090 P$="N":INPUT"Target Priorities";P$:IF P$="N" OR P$=CHR$(110)
OR P$="" THEN 3150
3100 N=0:FOR I=1 TO 2:IZ=3-I:CLS
3110 FOR J=1 TO 4:FOR K=1 TO 4:N=N+1
3120 PRINT S$(I);" WPN TYPE ";J;" : ";WS$(K);" PRIORITY ";
3130 PRINT S$(IZ);" Target Type":INPUT LP(N)
3140 NEXT K:PRINT:NEXT J,I:CLS:LJ$="N"
3150 LJ$="N":INPUT"Engagement Range (200 - 2500 meters)";LJ$
3160 IF LJ$="N" OR LJ$=CHR$(110) OR LJ$="" THEN 3170 ELSE LJ=VAL(L
J$)/100
3170 KG$="N":INPUT"Maximum Game Time (Seconds)";KG$
3180 IF KG$="N" OR KG$=CHR$(110) OR KG$="" THEN 3190 ELSE KG=VAL(K
G$)*IS
3190 NE$="N":INPUT"How Many Replications";NE$
3200 IF NE$="N" OR NE$=CHR$(110) OR NE$="" THEN 3210 ELSE NE=VAL(N
E$)
3210 IW$="N":INPUT"How Many Event Histories";IW$
3220 IF IW$="N" OR IW$=CHR$(110) OR IW$="" THEN IW=KO ELSE IW=VAL(I
W$):KO=IW
3225 IF IW>NE THEN IW=NE
3230 JH$="N":INPUT"Will You Want Hard Copy";JH$
3240 JH=0:IF JH$<>"N" AND JH$<>CHR$(110) AND JH$<>"" THEN JH=1
3250 CLS:POKE MB,NB:POKE MR,NR:POKE MT,NT
3260 FOR I=1 TO 2:L=NP(1)*(I=2):FOR J=1 TO NP(I)
3270 K=INT(RND(.1)*NP(I))+1-L:N=LT(K):KH=K:K=INT(RND(.1)*NP(I))+1-
L
3280 LT(KH)=LT(K):LT(K)=N:NEXT J:NEXT I
3290 PRINT"SUMMARY OF USER INPUTS"
3300 IF JH>0 THEN LPRINT"SUMMARY OF USER INPUTS"
3310 PRINT:IF JH>0 THEN LPRINT" :REM:A$:LPRINT" "
3320 K=KG/IS:PRINT"Max Game Time = ";K;" Seconds"
3330 IF JH=1 THEN LPRINT"Max Game Time = ";K;" Seconds"
3340 L=LJ*100:PRINT"Engagement Range = ";L;" Meters"
3350 IF JH>0 THEN LPRINT"Engagement Range = ";L;" Meters"
3360 PRINT"Number of Replications = ";NE
3370 IF JH>0 THEN LPRINT"Number of Replications = ";NE
3380 IF IW<1 THEN IW=0
3390 PRINT"Number of Event Histories = ";IW
3400 IF JH>0 THEN LPRINT"Number of Event Histories = ";IW
3410 IF JH>0 THEN PRINT"Hard Copy Output"
3420 IF JH<1 THEN PRINT"No Hard Copy"
3430 IF JH<1 THEN 3450
3440 LPRINT"Hard Copy Output":LPRINT" "
3450 PRINT"Press <ENTER> to Continue"
3460 G$=INKEY$:IF G$="" THEN 3460
3470 IF G$<>GG$ THEN CLS:GOTO 3020
3480 CLS:N=0:FOR I=1 TO 2:J=0:JJ=0
3490 PRINT S$(I);" Order of Battle":PRINT
3500 IF JH>0 THEN LPRINT" "
3510 IF JH>0 THEN LPRINT S$(I);" Order of Battle":LPRINT" "
3520 J=J+1:N=N+1:JJ=JJ+1:L=LT(N):L=(I-1)*16+(K-1)*4
3530 IF J>9 THEN 3550
3540 PRINT" :; IF JH>0 THEN LPRINT" ";
3550 PRINT J; "(";K;")";
3560 IF JH>0 THEN LPRINT J; "(";K;")"; ";
3570 FOR M=1 TO 4:L=L+1:PRINT LP(L);";"; ";
3580 IF JH>0 THEN LPRINT LP(L);";"; ";
3590 NEXT M
3600 PRINT:IF JH>0 THEN LPRINT" "
3610 IF J=NP(I) THEN 3630 ELSE IF JJ=12 THEN 3630
3620 GOTO 3520
3630 JJ=0:PRINT"Press <ENTER> to Continue"

```



number of Red weapons (NR), and the total number of elements (NT). So when it selects the low clock it knows which side that clock belongs to (IV), the serial ID of the weapon on that side (JX), and the event clock index (LX). Since it scans the event codes (in data block IO), it also knows which event code is associated with the low clock. Finally, since this is a critical-event-sequenced simulation, the routine knows that JT, the value in the low clock, is by definition the current time.

Note that this clock scan alternates between first Blue weapon to last Red weapon and last Red to first Blue. This alternating scan direction avoids bias. When events cluster densely in a simulation like Endgame, more than one clock may contain the low clock value. By alternating the direction of scan, Endgame ties are settled alternately in favor of Blue and Red.

Line 1240 and the machine-language subroutine it calls in high memory are the workaholics of the simulation. When the program invokes line 1240 it's saying, in effect, "Take a look at the event clocks and tell us what happens next."

This USR call at line 1240 returns values for five integer variables, IX, JX, KX, LX, and JT. (If the Z80 knew I was using IX it would probably have a fit. One of its index registers has this name, so I've cleverly called this variable "IV" in the Assembly-language routine.)

IX tells you which side is acting: Blue if IX's value is 1, Red if it's 2. IZ, the side being acted on, is naturally defined as 3-IX. JX is the serial ID, within the Blue or Red force, of the active element.

KX, the event code, indicates what kind of event begins or culminates at this instant. LX is the clock index of the active element and also its valid subscript in the Basic arrays IC, IG, IL, IR, and JB. Thus, the clock index of the element acted on (LX) is IG(LX), so you can readily find this element's serial ID within its own force.

Circle 258 on Reader Service card.

NEW

14 DAY MONEY BACK GUARANTEE

FORM FILE -N-

FILE MANAGEMENT SOFTWARE FOR YOUR MODEL I, III, 4, LNW, AND LIKE MACHINES

System written in Z80 assembly language for speed. Makes extensive use of online help menus (at any time with the touch of a single key) to insure easy operation. The FORM program allows you to structure your forms to fit your needs. Only field length restriction is screen size. Up to 135 fields per form.

Loading data with the FILE program is a snap, and you'll find working with the resultant records actually a pleasure due to the many ways provided for locating desired records. Retrieved records can be displayed, selected fields printed, or selected fields can be totaled.

YOU CAN PAY MUCH MORE FOR FILE MANAGEMENT SOFTWARE SYSTEMS, BUT BEFORE YOU DO, TAKE ADVANTAGE OF THIS MONEY BACK GUARANTEE TO TRY FORM-n-FILE. YOU HAVE NOTHING TO LOSE BUT YOUR DISORGANIZED DATA!!!

Package includes a 5 1/4" single sided, double density diskette (unless otherwise requested) and a user's manual.

Mail check or
money order to: **ATTN: NORM DRYE**
\$39.95 **E-SOFT SYSTEMS**
HCR 1, BOX 115G
PHONE 218/547-1381 **WALKER, MN. 56484**

Circle 248 on Reader Service card.

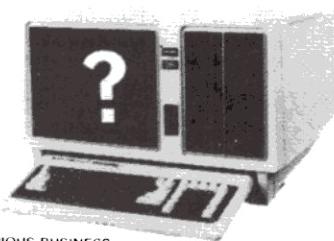
XENIX**MULTI-USER SOFTWARE**

WE HAVE THE ANSWER! MODEL 16 TRS-80 ACCOUNTING

ALSO AVAILABLE AS
SINGLE-USER FOR
THE MODEL II & 12

NEED SOMETHING
SPECIAL?

CALL US!



BUSINESS ANSWERS FOR SERIOUS BUSINESS
THE PROGRAMMER & ASSOCIATES
YOUR COMPUTER PROFESSIONALS!

- ACCOUNTS RECEIVABLE
- GENERAL LEDGER
- INVENTORY/INVOICING
- ACCOUNTS PAYABLE
- PAYROLL
- JOB COSTING

\$595 EACH (MODIFICATIONS ARE AVAILABLE)

MANUFACTURING INVENTORY \$995
PURCHASE ORDER \$395
ORDER ENTRY \$395

THE PROGRAMMER & ASSOCIATES, INC.
10802 FOREST LANE SUITE 110
DALLAS, TEXAS 75243
1-214-341-9874

Circle 306 on Reader Service card.

New from PowerSOFT™

Now Copy files From TRS-80 to PC/MS DOS or CPM and BACK with SuperCROSS/XT!

Did you just get a new Model 1000, 1200, or PC? How about CP/M? Just get that? Now with SuperCROSS/XT you can COPY your files TO or FROM 70 different DOS formats direct disk to disk! You can also FORMAT an alien disk, display the DIRectory or KILL files. Fully MENU driven with plenty of on-line HELP available! Very easy to operate in today's computer environment, especially for non-programmers.

GREAT new features make SuperCROSS/XT the transfer system of choice:

***"FOREIGN-TO-FOREIGN"** file transfers for the first time!! No longer a two step operation! Setup two different DOS formats in two different drives ala SU+ for COPYing files back and forth.

***MASS FILE TRANSFERS!** Now features a new TAG feature which allows you to "mark" any number of files for COPYing or KILLing!

***CONFIGURE** for the DOS you COPY from most, for faster automatic startup time!

SKIP command for reading or writing a 40 track disk in an 80 track drive!

PowerSOFT presents the state-of-the-art-file transfer program for use on the TRS-80! SuperCROSS/XT is designed to allow you to move DATA and program files freely between your own TRS-80 and DOS formats of other computers. You can now do this with SuperCROSS/XT and your existing hardware, eliminating modems, wires, and terminal program transfers. SuperCROSS/XT runs as a /CMD file under your TRS-80 operating system and will allow you to COPY files back and forth between different operating systems. You may format on a foreign disk in your TRS-80 and COPY files to it that can be read by, for example a Model 1000, a KAYPRO or an IBM PC. Note that machine language programs, although transferable, will NOT run due to the difference in microprocessor chips used in the different machines.

You can copy BASIC, PASCAL, FORTRAN, C, or other high level language programs, and run them with little modification, unless they make extensive use of graphics, or have machine language calls. CNVBASIC/CMD, available separately, will make most of the syntax and spacing changes required for converting Model I/III BASIC programs for use on other systems. Data files, spreadsheet files, and text files can also be usefully moved between machines. If you use or have the same Visicalc or Multiplan on the TRS-80, you can use the same files on other machines! These spreadsheet files are directly convertible to 123 and other calc-type programs. Of course, the combinations and possibilities are endless, and the flexibility is ALL there with SuperCROSS/XT!

DOS Formats Supported MS-DOS variations include MS-DOS 1.0, 2.0/2.1 single or double-sided (IBM and most compatibles), and Tandy 2000. CP/M variations include most well known single and double-sided formats including Tandy's 3.0+, Montezuma Micro 2.2 (all versions), Holmes and 60 others including: ALTOS, CROMEMCO, DEC, EAGLE, EPSON, HP 125, CP/M 86, KAYPRO, LNW-80, LOBO, MAX-80, MORROW, NEC, OSBORNE, OTRONA, SANYO, SUPERBRAIN, TELETEK, TELEVIDEO, TRS-80, LIFEBOAT/I, OMICRON/I, HOLMES/3, HURRICANE COMPACTOR/3, SHUFFLEBOARD/3, XEROX, ZENITH-HEATH, and 8" standard CP/M. *Of course double-sided drives are required for reading DS disks. Use SS for transfers, if needed.

If you use another computer besides your TRS-80 at work or home—you need SuperCROSS/XT so call or write, but order today! Only \$99.95. Check, VISA/Mastercard or COD accepted. Please add \$3 for shipping/handling (\$2 additional for COD). Foreign orders please add \$10 for AIRMAIL.

SuperCROSS/XT	\$99.95
(Please specify Model I-DD/II, 4/4P, or MAX-80 version)	
CNVBASIC/CMD (CONVERT BASIC for Mod I/III/4)	\$29.95
Converts I/II BASIC programs for use on MS-DOS, CP/M, or Mod 4!	
If ordered WITH SuperCROSS get BOTH programs for only	\$119.95

POWER SOFT

PowerSOFT Products
17060 Dallas Parkway, Suite 114
Dallas, TX 75248
(214)733-4475



All trademarks are the properties of the companies represented.



The fifth variable the USR call returns, JT, indicates the time.

The link between the Basic program and the machine-language subroutine is easily apparent; I've actually sent VARPTR(IC(1)) along in the USR call at line 1240. The call to GETHL at the

second entry point in Listing 2 loads the address of the event clocks into the HL register and we're on our way.

But what about communications in the other direction, from object module to Basic? Look at line 2640 in the main routine. This USR call passes VARP-

TR(IX) to the machine-language subroutine. Now look at line 2670, where IX, JX, KX, LX, and JT appear in the program for the first time. These five variables will stay where they are, side by side, no matter what.

Furthermore, if you know the address of IX's least significant byte (LSB), all you have to do is add 5 to it to get the address of JX's LSB. So, in that first call to the USR routine, I sent along the address of IX; the routine called GETHL and stored IX's address in K0. Each time the clock scan routine returns to Basic from subsequent calls, it dumps the values in IV, JX, KX, LX, and JT into the Basic variables IX, JX, KX, LX, and JT.

The Critical-Event Routines

My model has only five critical events: Search for Target, Select Target, Fire at Target, Assess Results of Fire, and End of Battle. These five events correspond to the five values (1-5) that KX, the event code, can assume. When KX is less than 5, Endgame calls the appropriate routine from line 1330. If KX equals 1, the Search for Target event code, the program calls the routine at line 1020.

The program defined LO immediately after the USR call in line 1240 as the sum of LX and IO. In the object module (see Listing 2), IO is the label of a 60-byte block where the clock scan routine finds the value of KX corresponding to the index of the low clock.

In the Basic program, IO contains the starting address, minus 1, of that block in high memory. So when Endgame adds LX to IO to get LO, it's pointing to the memory address where Endgame stores the event code for this particular element. When Endgame POKEs a 2 into this address, it's setting the next event for this weapon to select target.

Now you're into that deadly monotony; since the program has loaded the event code, it must now load the corresponding event clock. IE in the Basic program contains the starting address, minus 1, of a 255-byte block in high memory. The preprocessing routine has loaded this block so that entering it with a uniformly distributed (1-255) random index returns a value from an exponentially distributed random variable whose expected value is one scaled second. The program multiplies this value by the mean-time-to-detect for this weapon system type (KD(L)), adds the product to the current time (JT) and loads it into the LXth event clock.

The Select Target routine is at lines 1040-1090. This routine also detects

Listing 1 continued

```

3640 GS$=INKEY$:IF GS$="" THEN 3640
3650 IF GS$>GG$ THEN CLS:GOTO 3620
3660 IF J=NP(I) THEN CLS:GOTO 3710
3670 CLS:PRINT S$(I); " Order of Battle (contd.)":PRINT
3680 IF JB<1 THEN 3520
3690 LPRINT S$(I); " Order of Battle (contd.)":LPRINT"
3700 GOTO 3520
3710 NEXT I
3720 J7=JC:N=0:FOR I=1 TO 2:IF I=1 THEN J=0 ELSE J=LJ
3730 K=0:FOR L=1 TO NP(I):N=N+1:JB(N)=30-INT(RND(.1)*50)+1
3740 K=K+1:IF K>10 THEN K=1
3750 J7=J7+1:POKE J7,J:POKE J7+60,K
3760 NEXT L:K=0:NEXT I:M$=PP$:NX=0:CLS
3770 RETURN
3780 DATA .9,.9,1.3,.3:M$=PRS
3790 FOR K=1 TO 4:READ XM(K):NEXT K
3800 DATA 5,4,7,18
3810 FOR K=1 TO 4:READ PA(K):NEXT K
3820 DATA 11,8,5,2
3830 FOR K=1 TO 4:READ PV(K):IV(K)=PV(K)*100:NEXT K
3840 DATA 10,10,10,10
3850 FOR K=1 TO 4:READ KD(K):NEXT K
3860 DATA 90,90,90,90
3870 FOR K=1 TO 4:READ JL(K):NEXT K
3880 DATA .8,.9,.9,1,.6,.7,.7,.9,.7,.7,.7,.7,.7,.7,.7,.7
3890 FOR K=1 TO 16:READ PZ(K):NEXT K
3900 DATA .5,.8,.8,1,.4,.6,.6,.8,.7,.7,.7,.7,.7,.7,.7,.7
3910 FOR K=1 TO 16:READ P1(K):NEXT K
3920 J1=JR:J2=IH:J3=IK:J4=IE:J5=IO:J7=JC
3930 FOR J=1 TO 25
3940 FOR K=1 TO 16
3950 N=SQR(J12+K2)+.5
3960 GOSUB 4180
3970 J1=J1+1:POKE J1,N
3980 NEXT K,J
3990 FOR I=1 TO 30:J6=0:R=I*100
4000 FOR J=1 TO 4:X=XM(J):S=((R/1000)*X)[2:V=S*TP
4010 FOR K=1 TO 4:A=PA(K)
4020 N=(1-EXP(-A/V))*MM:J2=J2+1:POKE J2,N
4030 J6=J6+1:D=(PZ(J6)-P1(J6))/20:P=PZ(J6)-D
4040 N=P*MM:J3=J3+1:POKE J3,N
4050 NEXT K,J:GOSUB 4180
4060 NEXT I
4070 Z=1/255:DZ=Z:FOR I=1 TO MM
4080 KT=KT+1:IF KT=10 THEN KT=0
4090 N=ABS(LOG(Z))*18+1:J4=J4+1:POKE J4,N
4100 Z=Z+DZ:IF KT=0 THEN GOSUB 4180
4110 NEXT I
4120 M$=PP$:CLS:RETURN
4130 IF LM=0 THEN LM=1 ELSE LM=0
4140 IF LM=1 THEN PRINT#537,M$; ELSE PRINT#537,BL$:
4250 RETURN
4210 FOR I=-20480 TO -20267:READ J:POKE I,J:NEXT I:RETURN
4220 DATA 285,127,10,8,8,8,8,8,8
4225 DATA 34,214,176,201,205,127,10,8,8,8,8,8,8,8,8,8
4230 DATA 34,75,183,58,74,183,254,1,48,7
4240 DATA 62,1,58,74,183,24,4,175,58,74
4250 DATA 183,221,42,75,183,253,33,221,176,14
4260 DATA 1,58,74,183,254,1,48,14,58,216
4270 DATA 176,79,61,22,8,95,253,25,221,25
4280 DATA 221,25,58,216,176,71,33,255,255,34
4290 DATA 81,183,237,91,81,183,221,182,1,221
4300 DATA 110,8,183,237,82,48,18,25,34,81
4310 DATA 183,221,34,217,176,121,58,80,183,253
4320 DATA 126,8,50,79,183,58,74,183,254,1
4330 DATA 32,9,221,35,221,35,253,35,12,24
4340 DATA 7,221,43,221,43,253,43,13,16,198
4350 DATA 58,88,183,79,58,219,176,183,185,56
4360 DATA 13,62,1,50,77,183,58,88,183,58
4370 DATA 78,183,24,17,62,2,58,77,183,58
4380 DATA 219,176,79,58,88,183,183,153,58,78
4390 DATA 183,33,77,183,17,5,8,6,4,221
4400 DATA 42,214,176,126,35,221,119,0,221,25
4410 DATA 16,247,126,35,221,119,0,126,221,119
4420 DATA 1,281

```

End

when one side wipes out the other. That's why it sets KX equal to 5 (end of battle) and only sets KX to 2 when it finds a living target in the opposing force.

This routine seeks the highest priority target for the LXth element; it may cycle through the opposing force's order of battle as many as four times. When it selects the highest possible priority target, the routine loads the clock index of that target (LZ) into IG(LX). The routine loads the event code with 3 (fire at target) and loads the event clock with the current time plus time to lay the weapon (JL(L)) plus a random fraction of a second.

Lines 1100-1140 represent the firing routine. Here again, the program uses an elaborate structure of values POKE'd into high memory by the Basic preprocessing routine. This time the job is to

find the range to target without doing any dirty (floating-point) arithmetic.

The routine uses JD, the absolute difference between a weapon's X coordinate and its target's Y coordinate, and KD, the absolute difference between their Y coordinates, to enter the look-up table and get the range, at 100-meter resolution.

The routine then uses this distance and the round's speed, IV(L), to calculate time of flight. It loads the event clock with the current time plus this time of flight, and sets the event code to 4, assess result of fire. It accumulates in array MF the number of rounds fired by side and type for the output processor. The routine also saves the range to target in IR(LX) before it returns, since the assessment routine needs this value to determine the result of firing.

The assessment routine, lines 1150-

1230, first checks whether the weapon that fired has been killed in the meantime. Weapon types 1, 2, and 3 are treated as fire and forget, that is, once a round is fired, the effectiveness of the round doesn't depend on the firer's being alive. Weapon Type 4's missile aborts if its firer is killed before it reaches the target.

If the firer has been killed, the routine loads its event clock with infinity. Otherwise, it loads the event clock with the current time plus time required to lay the weapon (JL(L)) plus a random fraction of a second. Then the routine checks to see if the target has been killed already. If so, it loads the event clock with the current time plus a random fraction of a second, sets the event code to 1 (search for target), sets KX to zero to prevent an entry in the event history, and returns.

Program Listing 2. Source code for machine-language subroutine.

<pre> 01000 ORG \$B000H;SCAN3/SRC (Feb. 6, 1985) 01010 GETHL EQU 2687 01020 RETHL EQU 2714 01030 FIRST CALL GETHL; FIRST PUSH HL 01040 NOP ; POP IX 01050 NOP ; LD L,(IX) 01060 NOP ; LD H,(IX+1) 01070 NOP 01080 NOP 01090 NOP 01100 LD (K8),HL 01110 RET 01120 THEN CALL GETHL; THEN PUSH HL 01130 NOP ; POP IX 01140 NOP ; LD L,(IX) 01150 NOP ; LD H,(IX+1) 01160 NOP 01170 NOP 01180 NOP 01190 LD (IC),HL 01200 LD A,(SW) 01210 CP 1 01220 JR Z,ZERO 01230 LD A,1 01240 LD (SW),A 01250 JR SCAN 01260 ZERO XOR A 01270 LD (SW),A 01280 SCAN LD IX,(IC) 01290 LD IY,IO 01300 LD C,1 01310 LD A,(SW) 01320 CP 1 01330 JR Z,LDB 01340 LD A,(NT) 01350 LD C,A 01360 DEC A 01370 LD D,0 01380 LD E,A 01390 ADD IY,DE 01400 ADD IX,DE 01410 ADD IX,DE 01420 LDB LD A,(NT) 01430 LD B,A 01440 LD HL,\$FFFFH 01450 LD (JT),HL 01460 LL LD DE,(JT) 01470 LD H,(IX+1) 01480 LD L,(IX) 01490 OR A 01500 SBC HL,DE 01510 JR NC,L2 01520 ADD HL,DE 01530 LD (JT),HL 01540 LD (LOA),IX 01550 LD A,C 01560 LD (LX),A 01570 LD A,(TY) 01580 LD (KX),A 01590 L2 LD A,(SW) 01600 CP 1 01610 JR NZ,DECR 01620 INC IX </pre>	<pre> 01630 INC IX 01640 INC IY 01650 INC C 01660 JR JUMP 01670 DECR DEC IX 01680 DEC IX 01690 DEC IY 01700 DEC C 01710 JUMP DJNZ L1 01720 LD A,(LX) 01730 LD C,A 01740 LD A,(NB) 01750 OR A 01760 CP C 01770 JR C,L3 01780 LD A,1 01790 LD (IV),A 01800 LD A,(LX) 01810 LD (JX),A 01820 JR GO 01830 L3 LD A,2 01840 LD (IV),A 01850 LD A,(NB) 01860 LD C,A 01870 LD A,(LX) 01880 OR A 01890 SBC A,C 01900 LD (JX),A 01910 GO LD HL,IV 01920 LD DE,5 01930 LD B,4 01940 LD IX,(K8) 01950 LEAP LD A,(HL) 01960 INC HL 01970 LD (IX),A 01980 ADD IX,DE 01990 DJNZ LEAP 02000 LD A,(HL) 02010 INC HL 02020 LD (IX),A 02030 LD A,(HL) 02040 LD (IX+1),A 02050 RET 02060 K8 DEFS 2 ;CONTAINS ADDRESS OF BASIC VARIABLE IX 02070 NT DEFS 1 ;TOTAL NUMBER ELEMENTS (Blue + Red) 02080 LOA DEFS 2 ;CONTAINS ADDRESS OF LOW CLOCK 02090 NB DEFS 1 ;NUMBER OF Blue ELEMENTS 02100 NR DEFS 1 ;NUMBER OF Red ELEMENTS 02110 IO DEFS 60 ;EVENT CODES 02120 IH DEFS 488;P(B), SCALED 1=255 02130 IK DEFS 488;P(K/H), SCALED 1=255 02140 IE DEFS 255;EXPONENTIAL STRUCTURE 02150 JR DEFS 258;RANGE LOOK-UP TABLE 02160 JC DEFS 60 ;X COORDINATES 02170 KC DEFS 60 ;Y COORDINATES 02180 SW DEFS 1 02190 IC DEFS 2 ;ADDRESS OF EVENT CLOCKS 02200 IV DEFS 1 ;BASIC VARIABLE IX 02210 JX DEFS 1 ;BASIC VARIABLE JX 02220 KX DEFS 1 ;BASIC VARIABLE KX 02230 LX DEFS 1 ;BASIC VARIABLE LX 02240 JT DEFS 2 ;BASIC VARIABLE JT 02250 END </pre>
---	---

Using range to target (stored in IR(LX)), weapon type code, and target type code, the routine calculates an index that's added to IH and IK to find the scaled probability of hit and the scaled conditional kill probability. The routine first checks for a hit. If this fails, the routine simply returns, since it has already loaded the event clock and event code with fire again data.

Note that IJ keeps tabs on whether a strike is a miss, a hit, or a kill. Given a hit, the routine checks for a kill. If this fails, the routine returns. If the weapon scores a kill, the routine sets IL(LZ) to zero. If the target is type 4, or if the target's event code is less than four, the routine sets the target event clock to infinity.

The routine then calculates an index from side, weapon code, and target code, and accumulates data for the output processor to use in the killer/victim matrix. The routine loads the firing weapon's event clock with the current time plus a random fraction of a second, sets its event code to 1, and returns.

Lines 1280 and 1370 detect the end of battle. When the event code becomes 5, the postprocessing routine at lines 1660–2530 accumulates data collected during the replication. The program increments the replication index, NX, and checks whether NX equals NE, the number of replications specified. If this turns out to be the final replication, the program sets the flag KF and continues postprocessing.

Otherwise, the program stores data about the replication for later statistical analysis. The routine returns and the program calls the initiation routine in line 1580. This routine resurrects the dead, sets all event codes to search for target, seeds the event clocks with random values not greater than two seconds, sets all else to zero, and returns. And you're back in the same old wearisome grind again.

Other Matters

So much for the game loops. The postprocessing routine simply calculates sample means and standard deviations, displays this information on the screen, and writes to the printer if necessary.

Except for the preprocessing routine, the earlier parts of the program are fairly commonplace. The subroutine at lines 2670–3010 reads and defines constants. The one at lines 3020–3770 is an interactive user input routine. The subroutine at lines 4210–4360 reads the object module for the clock scan routine and POKEs it into high memory. The



subroutine at lines 2540–2570 initializes the output processor accumulators at the beginning of a simulation.

The routine at lines 3780–4170 reads inputs and also does the preprocessing. This latter function begins at line 3920. Preprocessing is an important part of this kind of simulation, especially when you're using a microprocessor with an 8-bit data bus. While preprocessing is done only once, the game loops use its output thousands and thousands of times.

Of particular concern in preprocessing is to make it unnecessary for the game loops to do any floating-point (known in the trade as dirty) arithmetic.

Line 3920 equates J1–J7 with addresses in high memory where the program will POKE data in a convenient form for the game loops. Lines 3930–3980 build the range look-up table in high memory. Since the range resolution of the simulation is 100 meters, this scheme can handle delta X and delta Y values up to 25,500 meters.

Lines 3990–4060 build the hit and conditional kill probability tables in high memory. The lines 4070–4110 build the exponential data structure used in the game loops when KX equals 1, search for target. Search time is determined by mean time to detect, plus a random entry.

Lines 4180–4200 blink a message on and off during pre- and postprocessing to reassure the user that the program hasn't gone into the high fantods.

In Defense of Micros

It's commonly assumed that it takes a mainframe to handle a computer simulation, but that's not so. I think interpreted Basic is more of a limitation than the microprocessor itself, and I find a compiler essential.

I kept Endgame simple so it would run on a 32K machine; a 48K computer should be able to handle 200 or more elements, a larger battlefield, and more complex weapon/target combinations. Mainframes or no mainframes, I expect to be using my Models 4 and 4P for simulation work for some time to come. ■

Joe R. Capps is an operations analyst who specializes in simulations of armed combat. Recently, he's been applying artificial intelligence techniques to combat simulations. You can write to him at 3052 Holmes Run Road, Falls Church, VA 22042.

Related Articles

Anderson, John M., "Line Up!," March 1980, p. 174. A Model I queueing simulation.

Cangro, Ronald A., "The Business of Planning," September 1983, p. 74. A Model I/III tutorial about Monte Carlo simulation techniques.

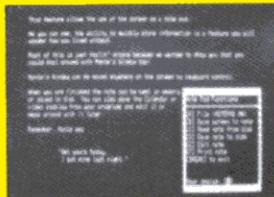
Neibauer, Alan, "Queue Theory," December 1981, p. 368. How queueing simulations work.



MONTEZUMA MICRO

PRESENTS
MONTE'S WINDOW™

NOTE PAD



WINDOWS ON YOUR MODEL 4!



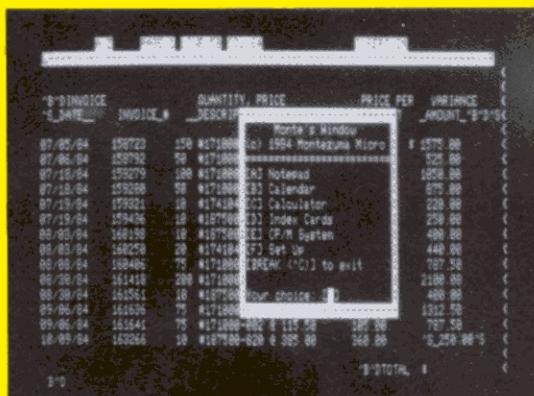
REQUIREMENTS

Montezuma Micro CP/M®
2.2 version 2.21+

128K RAM

Model 4 or 4P

8-bit Fever



CALENDAR



**TAKES NO
USER RAM!**

CALCULATOR



Pop Up Menus!

\$49

Easy to Use!



**INDEX
CARD FILE**

A touch of the keyboard opens a window in your screen for – a Note Pad, an Appointment Calendar, a Calculator, even a Mini Data Base. All yours for just \$49! Need RAM? Monte's Christmas gift to you – 64K and the window, both for **\$99!**

Once Upon A Time,

Monte Zuma, our Founder, President and King, has always had trouble keeping his desk organized. The Sidekick™ from Borland International would solve the problem, but alas, it was not available for CP/M®. So Monte asked his favorite nephew, the legendary LaMont E. Zuma (distant cousin to Rondo Talbot, a direct descendant of Monte Zuma himself) to work on the problem as best he could during recess at the home. LaMont, a true legend in his own time, really outdid himself this time. A touch of both shift keys halts your application program in its tracks and up pops **Monte's Window™** ready to use. What could be simpler? Put an end to the fumbling and pawing around the pile of papers on your desk. You will find **Monte's Window™** indispensable. When you are finished, break back to your application program and it resumes without error. **Monte's Window™** is truly a breakthrough. See for yourself—Look through **Monte's Window™** on your Model 4. How did you ever get along without it? See the page opposite for order information. **Monte's Window™** is available right now.

CP/M...The Software Key That Unlocks Your Model 4

CP/M is the standard 8-bit Z-80 operating system and many thousands of programs have been written to run under this system. With Montezuma Micro's CP/M you can run these programs on your Model 4/4P. Think about all those nationally known programs you've wanted to use. Programs like WordStar, dBASE II; SuperCalc; MultiPlan etc. With our version of CP/M 2.2 all those public domain programs on bulletin boards across the USA are available for free downloading. CP/M is the missing link that joins all this software to your Model 4/4P. Montezuma Micro's CP/M comes ready to use and requires no hardware modifications. This product has been awarded the best and highest ratings in the reviews and we are continuously improving it with you in mind. With our CP/M you get more than just a DOS. You get the other half of your Model 4/4P.

AVAILABLE NOW FOR IMMEDIATE SHIPMENT – Less Hard Disk Drive Support.....\$169
Optional Hard Disk Drive Support \$ 30

(Radio Shack 5M, 12M, 15M, 35M • Aerocomp/Percom 5M, 10M, 15M, 30M • Bi-Tech 5M, 10M, 11M, 15M, 20M, 30M, 40M)

FEATURES

- Full range of floppy drive support. Dual-head and/or 80 tracks.
- Optional hard disk support allows positioning and selective assignment of logical drives. Easy backup routine.
- Memory drive allows the use of the other 64K RAM bank on 128K machines.
- Modem 7, a powerful public domain communications program furnished at no charge, allows for file transfer and remote database access such as CompuServ and The Source.
- CONFIG is our flexible utility that allows complete control of all operating parameters from menus. Format, read and write more than 30 different manufacturer's disk formats with more being added rapidly.
- Disk Utility Program allows fast format, backups and verifying of ours and other manufacturer's disks.
- These CP/M utilities are included: ASM; DDT; DUMP; ED; LOAD; MOVECPM; PIP; STAT; SUBMIT; SYSGEN; and XSUB.

128K MEMORY UPGRADE

Our upgrade kit includes 64K RAM, a genuine PAL chip and instructions for installation. This kit will upgrade your 64K Model 4 to 128K and allow the use of our MEMLINK program and the TRSDOS 6.x MEMDISK. Guaranteed 1 year.

A BARGAIN AT ONLY \$74 Model 4
\$64 Model 4P – No PAL

WHY BUY OURS?

MONTEZUMA	RADIO	SHACK
Transient Program Area (TPA)	55K	52K
Bytes free in MBASIC	30,776	18,488
Bytes free of formatted disk	196K	160K
64K Memory drive	YES	NO
Double-Side/80tk drive support	YES	NO
Format, read/write other		
CP/M formats	YES	NO
Communication program included	YES	NO
Share HD with TRSDOS/LDOS	YES	NO
Assign multiple drives to HD	YES	NO
Boots from Hard Disk (4P)	YES	NO
Popular terminal emulation	YES	NO
User defined function keys	9	3
Timely product support	YES	NO

This popular software is available for the Model 4/4P using our CP/M.

WordStar Fast memory-mapped version 3.3	\$250
MailMerge Multi-purpose file merging program	125
SpellStar 20,000 word proof-reader on a stick	125
StarIndex Creates indices and Tables of Content...	85
DataStar Data entry and retrieval is yours	175
ReportStar Report generator and file manipulator....	150
InfoStar The above two programs	300
dBASIC version 2.8.....	385
TURBO PASCAL by Borland. This is the one.....	85
	45

ORDER INFORMATION

Call now and your order will be shipped immediately. We accept American Express, MasterCard and Visa plus we ship COD (cash or cashier's check only). Credit cards are not charged until your order is shipped. Add \$4 shipping per item on orders within the 48 states. Suitability of the software is the responsibility of the purchaser as there are **NO REFUNDS**. Defective items will be replaced upon their return, postpaid.

ORDER NOW ... TOLL FREE

800-527-0347
800-442-1310

The Toll Free lines are for orders only.
Specifications subject to change without notice.

CP/M is a Trademark of Digital Research, Inc.; Interchange and Memlink are Trademarks of Montezuma Micro; TRS-80 is a Trademark of the Tandy Corporation; WordStar, MailMerge, SpellStar, StarIndex, InfoStar, ReportStar, DataStar, SuperSort and CalcStar are Trademarks of MicroPro International Corporation; Multiplan is a Trademark of Microsoft.

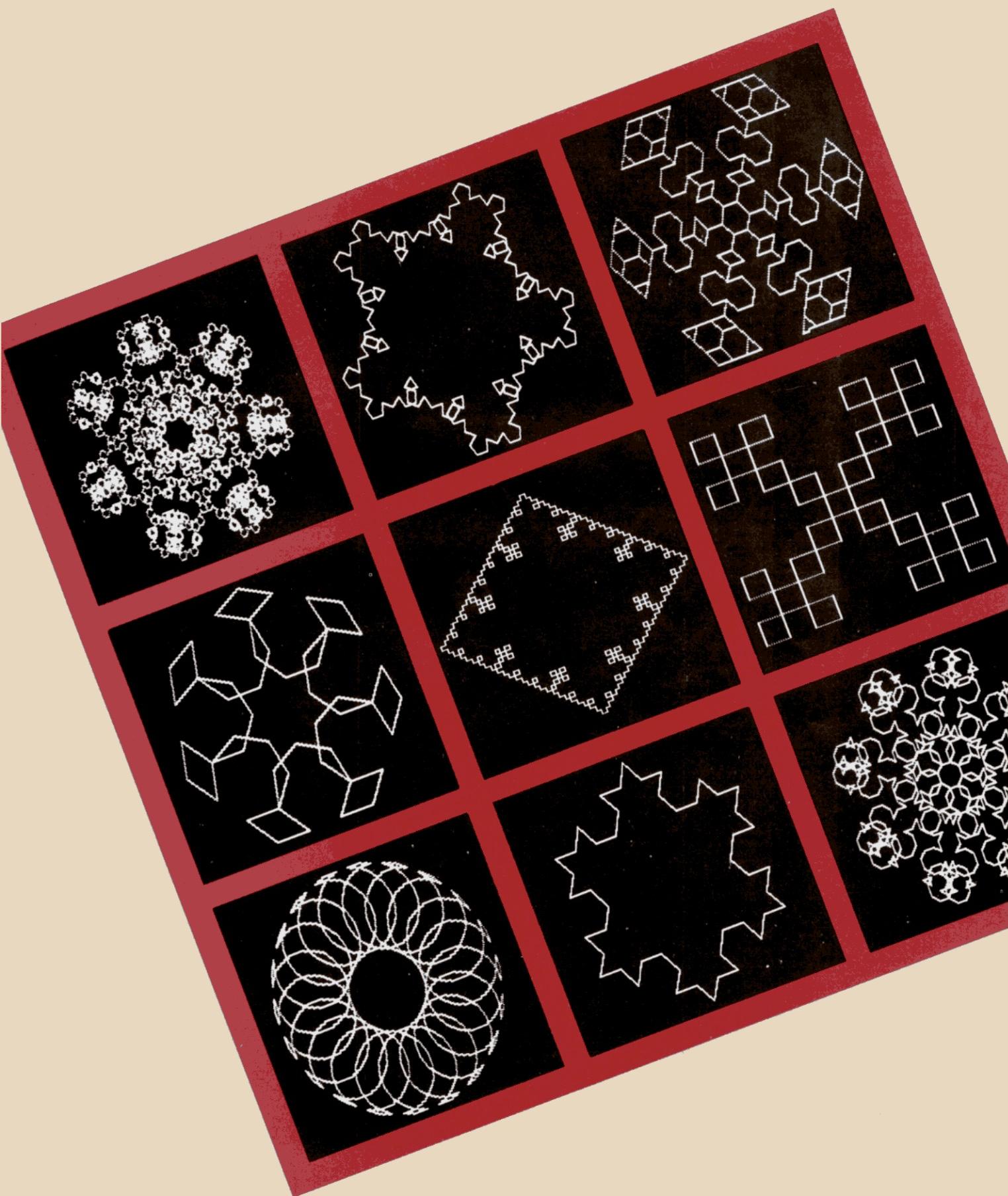


MONTEZUMA
MICRO

214-339-5104
Redbird Airport, Hangar #18
P.O. Box 32027
Dallas, Tx 75232



"WE KEEP YOU RUNNING"



When it comes to drawing fractals, the more detail you can get the better. That's because, by definition, fractals are geometric shapes with infinite detail. I've modified Michiel van de Panne's Model III fractals program (December 1984, p. 114) for systems equipped with high-resolution graphics. Increased screen resolution means you can now create more detailed, complex versions of van de Panne's fractals.

The modified program runs on the Models III and 4 with high-resolution boards. With the changes listed in the Table, it also works on the Tandy 1000 and 1200 (see the Photos). I've also added an option that lets you print the fractals, provided you have a graphics printer.

The Fractals Phenomenon

The December article explained the theory of fractals, so I'll keep my explanation brief. Fractal is a term mathematicians use to describe a kind of shape that occurs in nature. Fractals have detail that multiplies as it gets smaller, like a tree with a single trunk, several branches, and thousands of twigs. In true fractals, this detail is infinite. Another characteristic is that the smaller parts' shapes are similar to the outline of the object as a whole.

In nature, mountains and coastlines, crystals, and even broccoli can be fractals. In these cases, the detail isn't neces-

sarily a perfect copy of the whole. However, in regular, or geometric, fractals, all parts are exactly the same.

The geometric fractal in Fig. 1, for example, begins with an equilateral triangle. Each side of the large triangle sprouts a smaller triangle, each side of which sprouts a still smaller triangle.

A Wealth of Forms

My modified version of van de Panne's program (Program Listing 1) draws regular fractals like those in Fig. 1. Three specifications determine the fractal's shape. The first is the number of sides of the basic shape: Fig. 1 has three, Fig. 2 four.

Second, you must specify whether the program adds or subtracts smaller shapes. When the program subtracts volume from the basic shape, as in Fig. 2, you get what's called an inverse fractal. If the program adds volume, as in Fig. 1, the fractal is noninverse.

The third factor is the number of levels, that is, the number of times the program adds or subtracts smaller shapes. As the number of levels increases, the complexity of the fractal also increases. Even with high-resolution graphics, four levels is about as high as you can go.

When you type in and run the Listing, the program prompts you for the number of sides, inverse (type in Y) or

noninverse (type in N), and the number of levels. Then the program starts drawing the fractal. Don't expect complex fractals in seconds; when you get up to four levels, it can take well over an hour to finish a fractal.

The Listing's drawing algorithm is the same as van de Panne's, except for line 350, which uses the Line command to draw lines.

Line 20 establishes screen pixel size; you can easily modify the program to accommodate different screen resolutions.

I changed lines 230-250 to simplify the scaling necessary for multiple levels.

The printout routine at the end of the program uses the graphics utility GPRT2. Because I found that the printer's vertical and horizontal scales weren't equal, I adjusted line 340 accordingly. ■

You can write to Steve Justice at 128 Joann Drive, Moses Lake, WA 98837.

System Requirements

Models III and 4 with  High-Resolution board, Basic G
Models 1000 and 1200, Basic
32K RAM
Printer optional

Fractals in Focus

Produce fractals in intricate detail with this high-resolution program that draws the striking geometric designs.

by Steve Justice

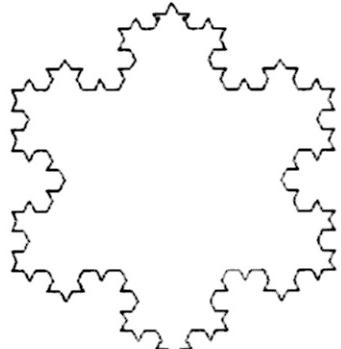


Figure 1. Three-sided, noninverse, three-level fractal.

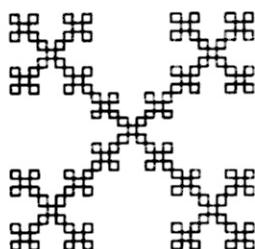


Figure 2. Four-sided, inverse, three-level fractal.

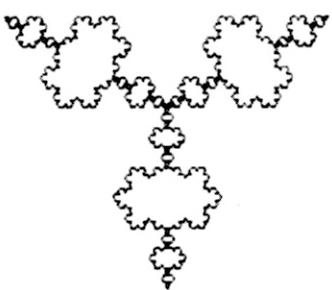


Figure 3. Three sided, inverse, four-level fractal.

```

10 KEY OFF : SCREEN 2
25 SF=.8
260 CLS : PSET (X2,Y2)
340 X=X+LL*COS(A1):Y=Y+LL*SIN(A1)*SF
420--440 INSERT YOUR OWN PRINT ROUTINE

```

Table. Modifications to the Listing for the Tandy 1000/1200.

Program Listing. High-resolution fractals program.

```

10 REM      FRACTALS FOR THE MODEL 3/4 WITH HIGH RESOLUTION
12 REM
15 REM      SCREEN PIXEL SIZES
20 CLEAR 2000 :CLS :CP=3.14159/180 :MX=620 :MY=240
30 INPUT "NUMBER OF SIDES":S
35 REM      BEGINNING X AND Y (SCALED TO SCREEN SIZE )
40 CX=MX*.7:CY=MY*.6:X2=CX:Y2=MY+1-CY
60 INPUT "INVERSE";I$:I$=LEFT$(I$,1)
70 REM      ANGLES TO TURN RIGHT AND LEFT
80 R=-360/S:L=R+180
90 IF I$="Y" OR I$="y" THEN C$="A":W=R:R=-L:L=-W ELSE C$="R"
100 A$=C$
110 IF I$<>"Y" AND I$<>"y" THEN 140
120 A1$="R":S1=S-2:FOR N=1 TO S1:A1$=A1$+"L":NEXT N:A1$=A1$+"R"
130 GOTO 160
140 A1$="L":S1=S-2:FOR N=1 TO S1:A1$=A1$+"R":NEXT N
150 A1$=A1$+"L"
160 INPUT "NUMBER OF LEVELS":LE:IF LE=1 THEN 230
170 REM EXPAND STRING FOR MULTIPLE LEVELS
190 FOR N=2 TO LE:LN=LEN(A$)
200 FOR N1=1 TO LN:B$=B$+MID$(A$,N1,1)+A1$:NEXT N1
210 A$=B$:B$="" :NEXT N
230 REM      SCALE SIZE OF DIAGRAM TO FIT ON SCREEN
240 LL=MX*1.25/(S*3[LE])
250 REM      CLEAR GRAPHICS SCREEN AND SET TO STARTING X,Y
260 CLR:GLOCATE (X2,Y2),0:SCREEN 0
265 REM      START DRAWING FIGURE
270 FOR Z=1 TO S
280 FOR N=1 TO LEN(A$)
290 B1$=MID$(A$,N,1)+A1$
300 FOR N1=1 TO LEN(B1$):B$=MID$(B1$,N1,1)
310 IF B$="A" THEN A=A+W:GOTO 330
320 IF B$="L" THEN A=A+L ELSE A=A+R
330 A1=A*CF
340 X=X+LL*COS(A1):Y=Y+LL*SIN(A1)
350 XP=INT(X):YP=INT(Y):X1=XP+CX:Y1=241-(YP/2+CY):LINE (X2,Y2)-(X1,Y1)
360 X2=X1:Y2=Y1
370 NEXT N1:NEXT N:NEXT Z
380 REM      END OF FIGURE
390 REM
400 A$=""
410 A$=INKEY$: IF A$="" THEN 410
420 SCREEN 1:CLS:PRINT "SEND TO PRINTER?":; Y$=""
430 Y$=INKEY$: IF Y$="" THEN 430
435 REM      SEND TO PRINTER - GRAPHICS UTILITY
440 IF Y$="Y" OR Y$="y" THEN SYSTEM "GPRT2"
445 REM
450 PRINT:PRINT "Another diagram?":;Y$=""
460 Y$=INKEY$: IF Y$="" THEN 460
470 IF Y$="Y" OR Y$="y" THEN RUN
480 CLS:END

```

End



PRINTER DRIVERS FOR SUPERSCRIPTSIT

Finally and automatically attach your printer to SuperSCRIPTSIT with an ALPS software driver program. No need to learn any special codes. Call or write for latest Product Review Sheet describing Features supported on each printer (underline, bold, Proportional, etc.)

Over 120 different printers supported.
2-1/2 years experience. Customer support.
\$49 or \$59 each, depending on which printer.

TIME-SAVERS TANDY 1000, 1200 TANDY 2000 IBM PC

IMPROVE PERFORMANCE & FLEXIBILITY OF YOUR PC APPLICATIONS

Use Memory as Superfast Disk \$49

RAMDISK - Use spare memory as a disk to speed up applications. (You specify RAMDISK size.) Appears to programs as a disk, but gives instant access. Easy to install and use. Superfast!

Directory / File / Backup Tools \$59

1. **Display alphabetized 5-column directory listings.** View entire directory at a glance on 1 screen.
2. **Find a file** - search thru all directories for a file name and display all occurrences.
3. **Directory Tree** - display directory tree structure below any name in easily readable form.
4. **Backup only modified files** - speed up and automate backup operation. Stores in same format as original for direct access. Great for hard disks!

User Tool Assortment \$59

1. Define a command as one key. Keyboard add - less typing and faster data entry by defining any command string as 1 key, then press key to perform.
2. **Count lines on files.** Displays count.
3. **Dump files in Hex and character** (with scrolling).
4. **Change ownership & attributes of files.** You can make files hidden, read-only, or reset to original.

Attach a Serial Printer \$49

With 2 easy commands, you can attach a serial printer to the RS232 port. Complete instructions.

More ALPS Tools are available. Call or write for catalog. All products are guaranteed to perform as advertised. We provide full customer support.

ALPS

23 Angus Road
Warren, New Jersey 07060
201-647-7230

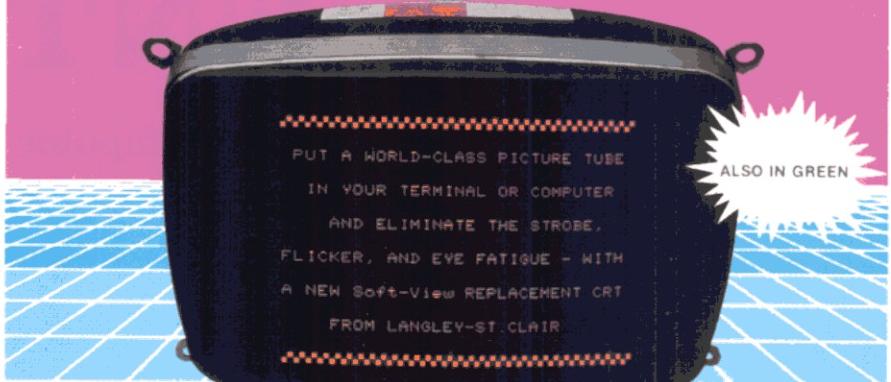


Put an Amber CRT in Your Computer

Now you can eliminate the strobe, flicker and fatigue from your computer terminal with a new amber Soft-View™ replacement CRT from Langley-St. Clair.

Available for the TRS-80, TeleVideo, Kaypro, Heath, DEC, Zenith, IBM PC, Apple III and a wide variety of other monitors. These new replacement display tubes use amber phosphors which exceed the European standards for persistence and color. And the "decay" or fade-out rate of the phosphor is the same as the "refresh" or scanning rate of the computer screen, so the display glows gently, rather than flickering like a strobe light - an annoying problem with inexpensive green phosphor tubes.

- Available in medium decay "European Phosphor" (the standard in Europe).
- Made with Lead/Strontium Impregnated glass that stops X-ray emission.
- High-contrast double dark face glass that also cuts U.V. radiation.
- Face of tube is etched to stop glare.
- Easily installed...comes with pre-mounted hardware.
- Ideal for word processing and programming, yet fast enough for games and graphics.
- Warranted for one full year against manufacturing defects or tube failure.
- Comes with a 30 day money back guarantee.



Call now to order your 'Soft-View'™ CRT
from Langley-St. Clair - \$99.95*

800 221-7070

In New York call 212 989-6876

Langley-St.Clair
Instrumentation Systems, Inc.
132 W. 24th St., New York, NY 10011

Please specify computer and model number when ordering. Dealer inquiries invited.

TRS-80, TeleVideo, Kaypro, Heath, DEC, Zenith, IBM PC, and Apple II are registered trademarks of Tandy Corp., TeleVideo Corp., Nonlinear Systems, Inc., Heath Co., Digital Equipment Corp., IBM, and Apple Computer, Inc. Soft-View is a trademark of Langley-St. Clair Instrumentation Systems, Inc.

NEW
COPYCAT 3

COPYCAT 3

NOW YOU CAN DUPLICATE VIRTUALLY ALL OF YOUR TRS-80 DISKETTES

COPYCAT 3 will allow you to make an exact duplicate of virtually all of your diskettes even if they are protected. And this includes your games and utilities. COPYCAT 3 automatically analyzes, formats, copies and verifies each track of the diskette you are duplicating. The entire process is amazingly fast, typically less than 70 seconds and even less with verify turned off.

COPYCAT 3 is intended for your personal use only, in making backup copies of your protected software.

COPYCAT 3 will run on the TRS-80 Model 3, 4 or 4P computers.

COPYCAT 3 \$49.95

*Please add \$2.00 for postage and handling. CA residents add 6% sales tax.
All orders are normally shipped the next business day via first class mail.*

OMNISOFT RESEARCH

2170 W. Broadway, #501A

Anaheim, CA 92804

(714) 772-5000

Dealer inquiries on your letterhead are welcomed.



CURRENT EVENTS

Power surges can prove fatal to computer equipment and data. Learn what causes destructive current oscillations and what to look for in effective protection.

You probably don't often question the quality of the electric current coming into your house or office. Usually, whatever the power company and Mother Nature conspire to send down the line is good enough.

But that's not the case if you're using computer equipment. The effects of uneven electrical impulses, called voltage spikes or surges, can have a devastating effect on both equipment and data. What might appear as minor glitches can cost hundreds or thousands of dollars in hardware repairs, not to mention the cost of lost data. What's worse, some power protection schemes offered by glib salesmen aren't any more effective than snake oil against the common cold.

The power supply on the Models III and 4 is relatively dependable—but it can't handle a 1,000-volt surge. It converts 120-volt household current into 5-and 12-volt inputs to the Z80 processor, memory circuits, and disk drives.

A spike can come in on any of the three lines associated with the electrical plug (hot, neutral, and ground) on your computer. It burns up the power supply, then travels into the microprocessor with devastating results. Small surges don't wreck the computer, but often imitate the computer's interrupt signal, causing spontaneous reboots and wiping out memory.

Spikes also affect peripherals. Many printers run under microprocessor control and contain buffer memory chips that are just as vulnerable to power irregularities as the system unit. The same holds true for external hard disks, printer buffers, terminals, and smart peripherals.

Surge Sources

Most people associate voltage surges with lightning, and sensibly refrain from using the computer during electrical storms. But surges have many other sources.

Everyday operations at a power plant, such as firing up an additional boiler to meet increased demand, can cause deadly spikes. Arc welding, which uses tremendous electrical currents, can also wreak havoc.

Voltage spikes can also occur when you remove loads from circuits. When a fuse blows, the overloaded circuit snaps off, abruptly removing the load from the electrical system. The system compensates for the sudden reduction in power load in microseconds, but that's all that's necessary to zap a computer and its peripherals.

Less dramatic and more common events, like turning on and off appliances, generate small spikes that are disruptive, but don't cause permanent damage.

Finally, radio frequency interference (RFI) and electromagnetic interference (EMI) are line noise generated by hair dryers, electric motors, and other sources. RFI/EMI is a very small voltage surge that can cause video glitches, screen jumps and wobbles, and garbled data.

Limited Tolerances

The voltage at which surges are disruptive varies with temperature, humidity, and a host of other variables. But even small voltage surges that reach the microprocessor can cause damage.

Transistor-to-transistor logic (TTL) circuitry operates in binary, with zero volts as "off" and 5 volts as "on." The Z80 microprocessor in the Models I, II, III, and 4 interprets voltages from -.3 to .8 volts as off and voltages from 2 to 5.25 volts as on. Voltages between these ranges are ambiguous. A surge of 1.2 volts is enough to bomb a program or scramble data. Voltages above 7 volts can destroy the Z80 in a wink.

Before a surge reaches the microprocessor, it must pass through the computer's power supply, which can absorb some minor disruptions. What the power supply can't absorb passes to the central processing unit (CPU).

The Z80 has a nonmaskable interrupt that can run a shutdown program if it detects a fatal power disturbance. Most Z80 microcomputers, however, have a switching power supply that uses a microchip to take slices of the incoming 120-volt ac waveform to create 5 and



Photo 1. EPD's KIWI surge suppressor.

12-volt dc output. A switching power supply can't alert the microprocessor of a surge on the way—and this is where a surge hits first.

From my experience, the Model I tends to reboot frequently from low-level line surges, while the Models III and 4 tend to be more steady. There's no telling how big a surge your computer can handle, however, so your best bet is to overprotect.

Protection Rackets

The traditional approach to protecting computers and peripherals from spikes is to unplug the computer and peripherals when they're not in use.

This solution is safe and cheap. Unfortunately, it's only effective when you're not using the computer. The only way to protect a running computer from spikes is by using a clamping device, commonly called a surge protector. These devices usually include an RFI/EMI filter and several protected power outlets.

Selecting a "power strip," however, isn't as simple as picking up any unit that claims to clean up line currents. Some devices labeled "line filters" or "power conditioners" are actually nothing more than RFI/EMI filters. Other devices, properly labeled "power surge protectors," contain fuses or other mechanical devices that cut the circuit when a surge occurs—but within a few 10ths of a second, not in the microseconds required for true protection.

MOVs and Gas Discharge Tubes

Most surge suppressors, such as EPD's Peach and Kiwi units, use metal oxide varistors (MOVs) for voltage clamping (see Photo 1). MOVs are resistors whose resistance decreases as volt-

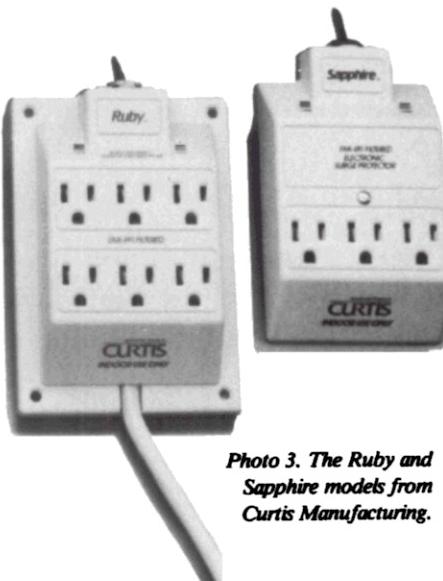


Photo 3. The Ruby and Sapphire models from Curtis Manufacturing.

ages increase. They provide an "easy out" for a voltage surge—an out that avoids valuable computer equipment.

A typical surge protection scheme wires the varistor between the line carrying the current to the protected outlets (the hot line) and the ground wire. At normal voltages the resistance on the varistor is high and the current goes to the outlets.

When a power surge occurs, the increased voltage reduces the resistance of the varistor, opening a path for the surge to the ground wire. Since electricity seeks the path of least resistance, the surge goes through the non-resisting varistor to the ground.

This is called common mode protection. While this is the most frequent source of surges, a spike can also travel through the neutral line, the ground line, or through a combination of lines.

The best surge protectors, like Severts-Zorman's Zapstar S-5P, contain three MOVs that protect against

surges in common mode (hot to ground), normal mode (hot to neutral), and from neutral to ground (see Photo 2).

Some units also include a gas discharge tube comprising two disks separated by a tube of radioactive gas. A surge jumps across the gap between the disks and is shunted from your equipment. Gas discharge tubes aren't as fast as MOVs, but they can accommodate a larger surge.

Manufacturer Ratings

Unlike car and appliance purchases, surge protectors have no common standard for comparison. Some are rated in amperes, some in joules, some in watts, and many carry no ratings at all.

The most reliable standard for comparison is the joule rating. A joule is a measure of electrical energy over a time constant (watts/microseconds). Joule ratings range from a minimum of 40 joules to a maximum protection of 200 joules. If the rating units differ or if a protector carries no rating, you can determine its reliability by looking inside the unit.

With minor differences only two types of varistors are appropriate for surge protection on 120-volt ac lines: the 14 millimeter MOV (Panasonic Series 20 or General Electric MOVs with a part number beginning with 10) and the 20 millimeter MOV (Panasonic Series 20 or General Electric MOVs with a part number beginning 20). The latter handles roughly twice the surge of a 14 millimeter MOV.

If you're curious what level of protection you have, or if you've convinced the salesman to let you look inside, look for the MOVs described above (see Photo 2). Look for small, dime-sized components covered with red plastic, with two wires coming from the bot-

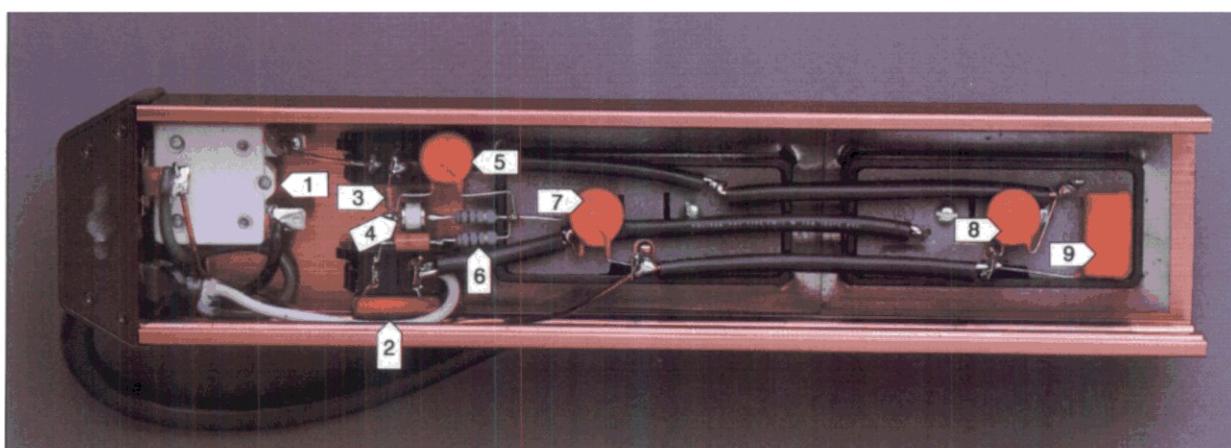


Photo 2. Innards of the Severts-Zorman Zapstar S-6P surge suppressor. (1) 15-amp circuit breaker. (2) Filter capacitor (hot to neutral). (3) Fuse. (4) Gas discharge tube. (5) MOV (hot to neutral). (6) Current limit resistors. (7) MOV (neutral to ground). (8) MOV (hot to ground). (9) Filter capacitor (hot to ground). (Unit courtesy of Severts-Zorman Engineering.)

**Now you and
your TRS-80 can team up for**

HASSLE-FREE PROGRAMMING with **LOAD 80**

It's true

More TRS-80* pleasure and fewer programming headaches can be yours all year with **Load 80**.

Load 80 comes in your choice of cassette or disk, and is filled with more than a dozen "ready to run" programs listed in **80 Micro**.

It's ready

"Ready to run" means the hard work has been done ahead of time! All you do is load and enjoy. No keyboarding hassles. No debugging.

Every *Load 80* features the high-quality tutorials, utilities, games, and word-processing programs you've come to expect from **80 Micro**. It has everything you need for enjoyable, practical, easy TRS-80 computing.

A subscription to *Load 80* is more than just a wise purchase. It's an investment! You'll be building your software library for a fraction of the cost of comparable programs sold in retail stores!

Yes! Save me time and money with LOAD 80. Send me:

- 1 year of LOAD 80 on disk for \$199.97
- 1 year of LOAD 80 on cassette for \$99.97
- This month's LOAD 80 disk for \$21.47
- This month's LOAD 80 on cassette for only \$11.47

Prices include postage and handling. Foreign airmail please add 45 cents per item or \$25.00 per subscription. U.S. funds drawn on U.S. banks only.

Check/MO MC Visa AE

L8505

Card # _____ Exp. Date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

**UTILITIES
TUTORIALS, HOME &
HOBBY APPLICATIONS**

FREE assistance

Should you need assistance, the technical editors at *Load 80* and **80 Micro** will be ready to lend a hand. Hassle-free programming for you and your TRS-80 can begin right now with a year's subscription to *Load 80*. Simply return the postage-paid order card next to this ad, or call **TOLL FREE 1-800-258-5473**. In NH, dial 1-924-9471.

* TRS-80 is a registered trademark of Radio Shack, a division of Tandy Corp.



Load 80 • 80 Pine Street • Peterborough, NH 03458

tom. If you find three MOVs, you're well protected. If you find none, look for another unit.

If you can't look inside the unit, check for a label stating conformance to the Institute of Electrical and Electronics Engineers (IEEE) standard. Protectors meeting this standard will

protect your equipment from normal mode surges.

Selecting Protection

When shopping for a surge protector, look for one that uses voltage clamping and that protects in normal and common modes. Many units, including the

Curtis Sapphire and Ruby models, provide RFI/EMI filtering in addition to surge protection (see Photo 3). Table 1 provides a sampling of surge suppressors and their features; Table 2 lists manufacturers addresses.

If a product states that it protects against voltage surges but doesn't in-

Manufacturer	Product	RFI/EMI Filtering	MOVs	Gas Discharge Tubes	Normal Mode	Common Mode	Joule Rating	On/Off Switch	Number Of Outlets	Cord Length	Status Light(s)	Price	Warranty	Comments
Curtis Mfg.	Sapphire	Y	3	0	Y	Y	70	Y	3	0	Y	\$79.95	Lifetime	
	Ruby	Y	3	0	Y	Y	70	Y	6	6	N	\$89.95	Lifetime	
	Diamond	N	3	0	Y	Y	70	Y	6	0	Y	\$49.95	Lifetime	
Computer Accessories	Powerline 4	Y	3	0	Y	Y	NA	Y	4	6	Y	\$49.95	1 yr.	
	Powerline 6	Y	3	0	Y	Y	NA	Y	6	6	Y	\$79.95	1 yr.	
Computer Power Solutions	System 3	N	3	0	Y	Y	150	N	1	0	Y	\$18.95	5 yrs.	
	System 4	N	4	0	Y	Y	150	Y	6	6	Y	\$79.95	5 yrs.	
	System 12	N	3	0	Y	Y	150	Y	6	6	Y	\$59.95	5 yrs.	
Dynatech	Surge Sentry MSF	Y	3	1	Y	Y	100	Y	6	6	Y	\$99.95	2 yrs.	
	Surge Sentry SC	Y	3	1	Y	Y	100	Y	5	6	Y	\$179.95	2 yrs.	
	Surge Sentry DSF	Y	3	1	Y	Y	100	N	4	6	Y	\$129.95	2 yrs.	Reset switch
Electronic Specialists	SKF-33	Y	1	0	Y	N	70	N	3	3	Y	\$49.95	5 yrs.	
	SKF-33M	Y	3	0	Y	Y	210	N	3	3	Y	\$87.95	5 yrs.	
	SKF-33S	Y	1	0	Y	N	70	N	3	3	Y	\$66.95	5 yrs.	
EPD	Kiwi	N	3	0	Y	Y	NA	N	1	0	Y	\$19.95	5 yrs.	
	Peach	Y	3	0	Y	Y	NA	N	3	0	Y	\$59.95	5 yrs.	
	Squash	Y	3	0	Y	Y	NA	Y	4	6	Y	\$99.95	5 yrs.	
Indus-Tool	Isobar 4-6	Y	3	0	Y	Y	70	Y	4	6	Y	\$79.95	1 yr.	
	Isobar 2-6	Y	3	0	Y	Y	70	Y	2	6	Y	\$54.95	1 yr.	
	Isobar 8-15	Y	3	0	Y	Y	70	Y	8	15	Y	\$97.95	1 yr.	
Kalglo Electronics	Mini II	Y	3	0	Y	Y	100	N	2	6	Y	\$49.95	1 yr.	
	Quad II	Y	3	0	Y	Y	135	N	4	0	Y	\$59.95	1 yr.	
	DPC	Y	3	0	Y	Y	135	Y	8	7	Y	\$89.95	1 yr.	Switch for each outlet
MFJ Enterprises	MFJ 1105	N	3	0	Y	Y	50	Y	12	6	Y	\$44.95	1 yr.	
	MFJ 1107	Y	3	0	Y	Y	50	Y	8	6	Y	\$79.95	1 yr.	
	MFJ 1109	Y	3	0	Y	Y	50	Y	8	6	Y	\$129.95	1 yr.	
Networx	Wire Tree Plus	Y	3	2	Y	Y	120	Y	6	9	Y	\$99.95	5 yrs.	
	Wire Tree	Y	1	0	Y	N	40	Y	4	9	Y	\$69.95	5 yrs.	
	Wire Cube	Y	1	0	Y	N	40	N	1	0	Y	\$29.95	5 yrs.	
Para Systems	Clean Power 1200	Y	1	0	Y	Y	100	Y	4	6	Y	\$49.95	2 yrs.	Flame retardant case
PMC Industries	Model 061	N	3	0	Y	Y	70	Y	4	0	Y	\$59.95	1 yr.	
	Model 062	Y	3	0	Y	Y	70	Y	2	0	Y	\$79.95	1 yr.	
	Model 038	Y	6	0	Y	Y	70	Y	6	6	Y	\$125.00	1 yr.	Reset switch
PTI Dataschild	Model 100	Y	4	1	Y	Y	200	N	6	6	Y	\$99.95	Lifetime	Reset switch
	Model 110 AMS	Y	4	1	Y	Y	200	N	6	6	Y	\$99.95	Lifetime	Reset switch
	Model 575	Y	4	1	Y	Y	200	Y	4	6	N	\$59.95	Lifetime	
Severts-Zorman Engineering	Zapstar S-6	Y	4	0	Y	Y	800	Y	6	6	Y	\$59.95	Lifetime	
	Zapstar S-6P	Y	3	1	Y	Y	200	Y	6	6	Y	\$79.95	Lifetime	
	Zapstar S-4	Y	3	0	Y	Y	50	Y	4	6	Y	\$39.95	Lifetime	
Tandy Corp./Radio Shack	Automatic Power Strip #26-1429	N	2	0	Y	Y	NA	Y	6	6	N	\$69.95	3 mos.	
	Spike Protector #26-1244	Y	2	0	Y	Y	50	Y	8	6	Y	NA	3 mos.	
Verité	Veri/Protektor	N	1	0	Y	N	90	Y	4	6	Y	\$49.95	1 yr.	Reset switch
	Veri/Protektor II	Y	1	0	Y	N	90	Y	4	6	Y	\$69.95	1 yr.	Reset switch
	Veri/Protektor III	Y	1	0	Y	N	90	Y	4	6	Y	\$189.00	1 yr.	Reset switch

Table 1. Features of sample surge protectors. NA means not available.

Computer Accessories Corp.
7696 Formula Place
San Diego, CA 92121
619-695-3773

Computer Power Solutions Inc.
8800 49th St. N., Suite 203
Pinellas Park, FL 33565
800-237-6010
813-544-8801

Curtis Manufacturing Co., Inc.
305 Union St.
Peterborough, NH 03458
603-924-7803

Dynatech Computer Power Inc.
21 Governor's Court
Baltimore, MD 21207
800-638-9098

Electronic Protection Devices Inc.
41 Montuale Ave.
Stoneham, MA 02180
617-279-0424
800-343-1813

Electronic Specialists Inc.
171 S. Main St.
Natick, MA 01760
617-655-1532

Indus-Tool
325 W. Huron St.
Chicago, IL 60610
312-642-6871
800-662-5021 (orders only)

Kaglo Electronics Co. Inc.
6584 Ruch Road
Bethlehem, PA 18107
215-837-0700

MFJ Enterprises Inc.
921 Louisville Road
Starkville, MS 39739
800-647-1800
601-323-5869

Networx
203 Harrison Place
Brooklyn, NY 11237
800-522-2222

Para Systems Inc.
11425 Mathis St., Suite 404
Dallas, TX 75234
214-869-1688

PMC Industries
9353 Activity Road, Suite K
San Diego, CA 92126
619-695-3520

PTI Datashield
320 River St.
Santa Cruz, CA 95060
408-429-6881

Severts-Zorman Engineering
7144 W. McNab Road
Fort Lauderdale, FL 33319
305-722-7770

Tandy Corporation/Radio Shack
1800 One Tandy Center
Fort Worth, TX 76102
817-390-3700

Verité
1614 W. Anaheim Road
Harbor City, CA 90710
213-325-0200

Table 2. List of manufacturers' addresses.

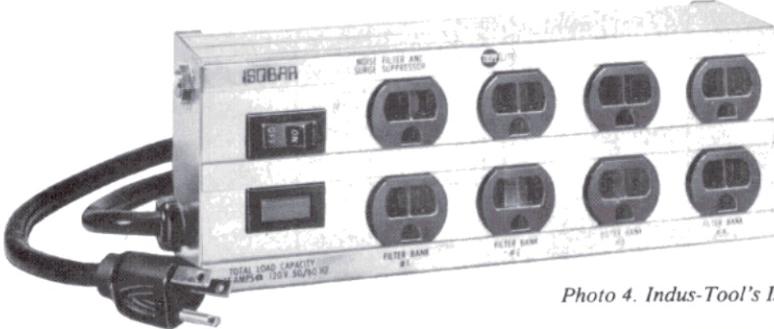


Photo 4. Indus-Tool's Isobar 8-15.

Circle 381 on Reader Service card.

TRS-80 COMPUTERS **BODEX CORP.**

MODEL 1000	\$979 ⁰⁰
MODEL 1200	\$2149 ⁰⁰
MODEL IV	\$959 ⁰⁰
MODEL IV P (LIMITED SUPPLY)	\$850 ⁰⁰
MODEL 2000	\$1999 ⁰⁰
MODEL 100 8K	\$339 ⁰⁰
MODEL 100 24K	\$479 ⁰⁰
MODEL 200	\$799 ⁰⁰

COMMUTER COMPUTER
\$1999⁰⁰

OKIDATA
92

\$379⁰⁰

93

\$575⁰⁰

STAR GEMINI PRINTERS
SG10

\$239⁰⁰

SG15

\$379⁰⁰

ALL TRS-80 PRINTERS

BODEX CORP.

244 E. Main St.
Marlboro, MA 01752
Phone (617) 485-5115 or 481-1027
TRS-80 Trademark of TANDY

Circle 150 on Reader Service card.

You're in Good Company When You Program in BetterBASIC



BetterBASIC features include: 640K, STRUCTURED, MODULAR, INTERACTIVE, EXTENSIBLE and COMPILED. Prices: BetterBASIC: \$199; 8087 Math Module: \$99; Runtime System: \$250; Sample Disk: \$10.

Summit Software Technology, Inc.™ 1-800-225-5800
P.O. Box 99, Babson Park, Wellesley, MA 02157

MasterCard, VISA, P.O. Checks,
Money Orders and C.O.D. accepted.

BetterBASIC is a registered trademark
of Summit Software Technology, Inc.
IBM PC and IBM PC/XT are registered
trademarks of International Business

Machines Corp. Tandy is a registered
trademark of Tandy Corp. Illustrated
above are registered trademarks of the
following companies: Mobil Oil Corp.,
AT & T, General Electric Co., Westing-
house Electric Corp., TRW, Inc.

ALSO AVAILABLE FOR THE TANDY 1000, 1200 AND 2000



Photo 5. The Kalglo Electronics Quad II.

reliability is to buy a device that states that it uses MOV voltage clamping with RFI/EMI filtration.

Extra Charges

Some suppressors include an extension cord. Indus-Tool's Isobar 8-15, for example, includes a 15-foot cord, while Kalglo Electronic's Quad II (see Photos

4 and 5) plugs directly into an outlet. Units are also available with a main switch that turns all outlets off at once, or with LED displays that tell you system status and/or whether a spike has occurred. Such niceties add to the price of surge protection, but might be worth the extra cash to you.

Caveat

Finally, even the best surge protectors have their limits. A surge containing more energy than a surge protector's rating "splashes over" into your equipment. MOV-equipped surge protectors handle most surges with no splashover, but nothing can protect your equipment against a direct lightning hit.

Three MOVs weigh less than an ounce, but can save you thousands of dollars in less than a 10th of a second. A good surge protector is the best insurance you can buy. ■

Mark D. West is a doctoral student in journalism at the University of North Carolina at Chapel Hill. Contact him at P.O. Box 325, Chapel Hill, NC 27514.

Circle 485 on Reader Service card.



Power Problems?

AEGIS™ . . . Power Conditioning Equipment . . . THE SOLUTION Protects From Damaging Voltage Surges, Lost Data, & Costly Down Time



SPIKE-SPIKER®
Transient Voltage Suppressors & Noise Filters
Eleven Models — All Models Rated 120V, 15A

Deluxe Power Console—2-stage transient absorber; dual 5-stage filter; common & differential mode protection; nano seconds response; clamping at 150V; 8 individually switched sockets; fused; main switch; 7' cord and status light. **\$89.95**

Quad Power Console—6-stage transient absorber; dual 5-stage filter; common & differential mode protection; pico second response; clamping at 131V; four outlets; fused, master switch; 7' cord and status light. **\$75.95**

Mini II—Direct AC Plug-In; 2-stage transient absorber; dual 3-stage filter; common & differential mode protection; nano second response; clamping at 150V; two outlets and status lite. **\$44.95**

LINE-SAVER™
Standby Uninterruptible Power System
—Clean Reliable Power System—

Model LS-240—240 watts—VA capacity—\$495**

Model LS-480—480 watts—VA capacity—\$795**

Back-up time: 11 min. full load, 27 min. ½ load, 43 min. ⅓ load; multiple-AC outlets, 3-staged transient protection; 4-staged RFI/EMI filter; sealed rechargeable internal battery; master control switch; test switch; external fuses; detachable 6' cord; external DC connectors for mobile use and extended hold-up time; many more exclusive features.

Call or write for free literature.

Dealer inquiries invited.



KALGLO
6584 Ruch Rd., Dept. B
Bethlehem, PA 18017

INSTANT ORDER LINE
800-524-0400 TWX 501-651-2101
IN PENNA. 215-837-0700

PA Res. add 6% sales tax; for COD add \$3.00 + shipping & handling. All pre-paid SPIKE-SPIKER orders, freight allowed. All LINE-SAVER orders add \$10.00 shipping & handling.

SURGES!
SPIKES!
RFI/EMI!
DIPS!
SAGS!
BLACKOUTS!
BROWNOUTS!

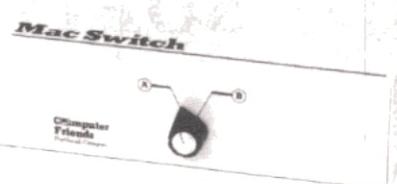
\$54.95 +



Mac Switch

Mac Switch lets you share your computer with any two peripherals (serial or parallel). Ideal for word processors—never type an address twice. Ask us for brochure with tips on how to share two peripherals (or two computers) with MAC SWITCH. Total satisfaction or full refund.

\$99.00



Order toll free 1-800-547-3303

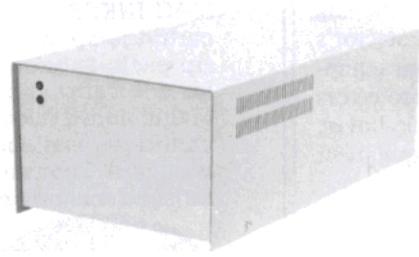
Computer Friends

6415 SW Canyon Court
Suite #10
Portland, Oregon 97221
(503) 297-2321
Dealer inquiries welcome

Price Changes
Occur On A
Daily Basis.
Please Call
1-800-343-8841

Price Changes
Occur On A
Daily Basis.
Please Call
1-800-343-8841

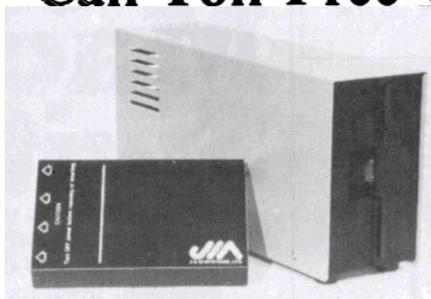
Super Sale on New Hard Drives



Warranty - One Full Year

DRIVE A HARD BARGAIN™

Call Toll Free Ordering 1-800-343-8841



High Quality Lowest Price

Drive 0, 1, 2, 3

for the

Color Computer

Starting at \$199.95 CALL FOR NEW LOW PRICE

Introducing

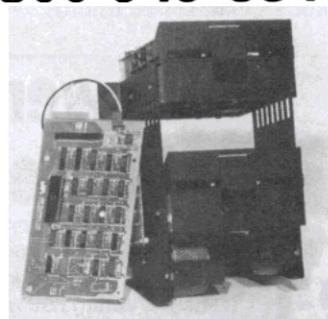
MEGADISK™

Winchester Hard Drive ready to run on the TRS 80 Model I/III/IV/4P, Color Computer, I.B.M.-PC, Apple, Franklin, Max/80.

Software Drivers: LDOS, NewDos/80, Dosplus, TRSDOS 6.0, CP/M

CALL FOR NEW LOW PRICE

Complete systems starting at \$699.95



Disk Drive Upgrade
for Model III/IV easy to install system
Starting at \$309.95 CALL FOR NEW LOW PRICE

SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425

Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10:00 am to 3:30 pm

DEALER INQUIRIES INVITED.

TERMS:

M.C./Visa/Amex and personal checks accepted at no extra charge. C.O.D., please add \$3.00.

Shipping: Please call for amount. Not responsible for typographical errors. Prices subject to change.

TRS/80 Registered Trademark Tandy Corp.
IBM-PC Registered IBM Corp.
LDOS Reg. Logical System Inc.

CANADA

MICRO R.G.S. INC.

751, CARRE VICTORIA, SUITE 403
MONTREAL, QUEBEC, CANADA, H2Y 2J3
Regular Tel. (514) 287-1563
Canadian Toll Free 800-361-5155

Service! Service!

All in stock products are shipped within 24 hours of order.

Repair/Warranty service is performed within 24 hours of receipt unless otherwise noted. We accept C.O.D., foreign and APO orders. School and D&B corporate P.O.s accepted.

Apple Registered Trademark Apple Computer Corp.

Franklin Registered Trademark Franklin Corp.

Dosplus - Micro Systems Software

Max/80 Registered Trademark Lobo Int.

Newdos/80 - Apparat Inc.

**Prices Change
Every Day.
Please Call
1-800-343-8841
For Lower Prices.**

PRICE BREAKTHROUGH

DEALER INQUIRIES INVITED

**Prices Change
Every Day.
Please Call
1-800-343-8841
For Lower Prices.**

MEGADISK™ HARD DISK DRIVE SYSTEMS

For the { IBM/PC, Tandy 1000, TRS/80 Models I/III/IV/4P, Compaq, Eagle, Sanyo, Tava, PC Workalikes, Color Computers, Apple/Franklin, Heath/Zenith, Max/80 Complete with Hardware, Cables, Software and Quikfit Installation

TOLL FREE ORDERING 1-800-343-8841

5 Megabytes Internal Mount (IBM Special)	starting at	\$299.95
10 Megabytes Internal Mount — Low Power — Boots Just Like An XT	starting at	544.95
20 Megabytes Internal Mount	starting at	799.95
5 Megabytes External System	starting at	499.95
10 Megabytes External System (IBM Format Equals 11.2 Megabytes — An Extra 1.2 Megabytes for the IBM)	starting at	699.95
20 Megabytes External System	starting at	999.95
Streaming Tape Backup System — Internal Or External	starting at	499.95

DOS Systems Available: { IBM/Heath — DOS, 1.0, 2.0, 2.1, 3.0, or later — Apple Franklin — DOS 3.3, Prodos TRS/80-LDOS, TRSDOS 6.x, Newdos/80, Dosplus 3.5, CP/M, COCO DOS, Max/80 LDOS, OS9

FULLY WARRANTIED — PARTS AND LABOR — 24 HOUR SERVICE — CALL TOLL FREE — 1-800-343-8841

FLOPPY DISK DRIVES, POWER SUPPLIES AND CABINETS

Our Disk Drives are UL approved — Our Floppy Drive Cabinets and Power Supplies are Underwriters Laboratory Listed and have passed the required Federal Communications Part 15 Section B-EMI/RFI tests.

Warranty on all disk drives is one full year parts and labor. Warranty on floppy disk drive power supplies is five (5) years. In warranty or out of warranty service is 24 hour turn-a-round on all disk drives and power supplies.

Tandon — Full Height Drives

100-1 Single Sided 40 tk Bare	\$128.00
In Case with Power Supply	169.95
Dual Drives in One Cabinet	329.95
100-2 Dual Sided 40 tk Bare	165.00
In Case with Power Supply	209.95
Dual Drives in One Cabinet	384.95
Half High Drives	
65-1 Single Sided 40 tk Bare	125.00
In Case with Power Supply	159.95
Dual Drives in One Cabinet	309.95
65-2 Dual Sided 40 tk Bare	145.00
In Case with Power Supply	179.95
Dual Drives in One Cabinet	349.95
65-4 Dual Sided 80 tk Bare	165.00
In Case with Power Supply	199.95
Dual Drives in One Cabinet	359.95

TEAC Half High Drives

55A Single Sided 40 tk Bare	128.00
In Case with Power Supply	169.95
Dual Drives in One Cabinet	319.95
55B Dual Sided 40 tk Bare	160.00
In Case with Power Supply	199.95
Dual Drives in One Cabinet	359.95
55F Dual Sided 80 tk Bare	180.00
In Case with Power Supply	219.95
Dual Drives in One Cabinet	389.95

Apple/Franklin Disk Drives

35/40 Track in Case with Cable and Software	174.95
Controller Card for Two Disk Drives	49.95
Combination Price for Disk Drive and Controller	199.95
Commodore Disk Drives	239.95

Power Supplies and Cabinets 5 1/4" and Hard Drive Systems

starting at 45.00

COLOR COMPUTER DISK DRIVE SYSTEMS AND ADD IN PRODUCTS

35 Track Single Head Drive with Case, Power Supply, Cable Controller, Instruction Booklet, Diskettes	\$244.95
Above with Dual Drives in One Cabinet	499.95
40 Track Dual Head with Case, Power Supply, Cable Controller, Instruction Booklet, Diskettes	289.95
Above with Dual Drives in One Cabinet	429.95
128 Memory Upgrade Kit	129.95
Dual DOS Switch	19.95
With Second DOS System — JDOS, RSDOS, Micro DOS, and Booklet	59.95

TRS/80 HARDWARE

Model I Starter System — Delivered by UPS	
One Single Sided Disk Drive, Case, Cable, Power Supply, TRSDOS 1.3 and Manual	\$220.00
Model III/IV Easy to Install Disk Drive Systems	309.95
Memory Upgrades — 4116 and 4164	starting at 1.50 ea.

ALL IN-STOCK ITEMS SHIPPED WITHIN 24 HOURS. SAME DAY SHIPPING PROVIDED BY REQUEST WITHOUT ANY EXTRA HANDLING CHARGES.

© 1985 SOFTWARE SUPPORT, INC.

1 Edgell Road, Framingham, MA 01701 (617) 872-9090 Telex-383425

Hours: Mon. thru Fri. 9:30 am to 5:30 pm (E.S.T.) Sat. 10 am to 3:30 pm

SERVICE POLICY — Our Professional Technical Staff Is Available To Assist You Monday Through Saturday.
WARRANTIES — Up To One Full Year Parts And Labor. Floppy Disk Drive Power Supplies — Five (5) Years.

SERVICE — 24 Hour Turn-A-Round On All In-Stock Parts. Dealer Inquiries Invited. Call 617-872-9090

Please Call For Shipping,
Handling And Insurance.

Toll Free 1-800-343-8841

Please Call For Our Latest Price Saving Specials.

Not Responsible for Typographical Errors.
Prices and Specifications May Change
Without Notice.



RESTRICTED ENTRY

by José E. Anaya

Prompter lets you specify the kind of prompted input your programs accept.

You're finished entering data in an application program, and at the file name prompt you type in DATABASE3 and hit the enter key. Everything is fine until you look for the DATABASE2 file. It's gone. You forgot: The input routine accepts only eight characters. You wrote over DATABASE2.

My Basic input routine, Prompter, solves this problem by letting you specify the type and number of characters a program accepts as input. In addition, Prompter replaces the question mark prompt with a blinking cursor, preserves the screen line following input (most input routines clear the screen), allows multiple inputs on the same line, and rejects input that erases the display.

70 • 80 Micro, May 1985

The Shortcomings Of Input Routines

Input and LINEINPUT statements often cause program crashes. Both accept any character you type in from the keyboard, including destructive input such as the clear key or line feeds.

These input statements accept characters typed in from the keyboard up to the limit of the input buffer. Many programs issue a caveat: "Enter a file name of up to eight characters." However, you still might accidentally enter more characters.

Also, these input statements limit you to entering only characters represented on the keyboard. You can't, for example, enter ASCII 191 (a block character).

Finally, input statements erase the screen after you press the enter key

because Basic inserts a carriage return as a terminator.

The Routine

You can insert Prompter anywhere in a program. Models I, III, and 4 owners should use Program Listing 1. Program Listings 2 and 3 contain changes for running the routine on the Models 1000/1200 and the Model 2000.

To use the routine, you first have to define several variables to control the cursor and represent valid characters as shown in lines 60 and 80, respectively. Do this early in the program.

Variable BS\$ in line 60 is the backspace character. I use it to erase the last character typed in. The Models 1000 and 1200 recognize CHR\$(8) as the backspace key input but it doesn't per-

form the back-up and erase functions—it prints a block character. Use CHR\$(29) to move the cursor left and CHR\$(32) to erase.

Variable CR\$ is the carriage return character for the enter key, and PT\$ is the cursor character. I use ASCII 132—a block character—as the cursor.

You must also define strings of valid characters the routine can accept. You can define other sets of characters or enhance those shown in line 80. AU\$ represents the uppercase alphabet; NU\$ represents numbers 0–9, the period, and the hyphen characters.

You might want to add the space or backslash characters to AU\$ or add the lowercase alphabet: AL\$ = "abcdefghijklmnopqrstuvwxyz."

Program Operation

The subroutine in lines 110–130 is a keyboard scanner loop that controls the iterations to blink the cursor. You can change the number of iterations to make the cursor flash faster or slower, but be sure to define X as a single-precision number, not as an integer. At line 120, the statement X=30 lets you exit the loop as soon as you press a key.

Line 150 turns on the cursor, calls the scanner to get a character, then turns off the cursor by backspacing over it (rather than replacing it with a space character). This technique makes sure that when you exit, you get the cursor positioned after the last input character.

After turning off the cursor, the routine tests Z\$, the INKEY\$ variable, for a pressed key that terminates scanning.

If you aren't pressing a key, line 160 recalls the Scanner subroutine with the cursor turned off and the procedure repeats until you press a key. With the cursor turned on, you can't exit the loop.

The Cursor subroutines get a character from the keyboard and the subroutine at lines 170–220 displays and validates it.

Line 180 sets the input buffer, BF\$, as an empty string and sets buffer length (LN) to zero. You can control the buffer length by PEEKing VARPTR(BF\$) or by computing LEN(BF\$).

Line 190 GOSUBs to the Cursor subroutine, which goes to the keyboard scanner subroutine. If you press the enter key, the subroutine ends and control returns to the point where the program requested input.

Note the CR\$ variable isn't displayed, so you can input more variables on the same line. You can't do this with Input or LINEINPUT statements unless you control the cursor position

with a PRINT@ statement. However, this approach doesn't prevent Basic from destroying the next display line. With Input or LINEINPUT you can't avoid scrolling at line 16 on the screen because of the carriage return that the interpreter inserts.

Line 200 determines whether or not you entered a backspace character. It goes to line 210 if it finds a backspace; otherwise it goes to line 220.

Line 210 tests the buffer length. If the buffer is empty, the routine rejects the backspace to avoid destroying the input line. The program then goes back to the Scanner subroutine through the appropriate call at line 290. If the buffer isn't empty, the routine decrements the buffer length by 1, adjusts the buffer to drop the right-most character, and returns to the Scanner subroutine.

Line 220 tests for a valid character by searching Z\$ through the valid character set. Define the valid character set before the line that calls the subroutine in the main program by setting VD\$ (the valid character set string) to include all characters valid for the specific input. For example, you might specify VD\$=AU\$, VD\$=NU\$, or VD\$=AU\$+AL\$, or whatever you need.

It also tests the buffer length LN full status by comparing LN, the actual buffer length, against LM, the maximum input length. Set LM from the calling line in the main program. Define LN and LM as integers to get a fast system response.

If the routine detects an invalid character or a full buffer, it rejects Z\$ and directs control to the Scanner subroutine. Press the backspace or enter keys for a full buffer condition, or enter a valid character.

If you press a valid character and the routine finds unused space in the buffer, it increments the length by 1 and the buffer incorporates and displays the new character. Control then returns to the Scanner subroutine.

A Short Demonstration

Lines 499–560 contain a small program that illustrates the correct calling procedures. This program prompts you for a name and a check number.

Assume that you want users of your program to type in a name no more than 30 characters long in uppercase, with periods and spaces as acceptable input. You also want users to enter a check number no longer than five characters.

Line 510 sends the prompt, defines the valid character set for names, and sets the maximum number of characters

to 30. Line 520 calls the Input subroutine. If you enter no characters, control returns to the subroutine.

Line 530 transfers the buffer to the permanent variable CN\$ and uses a Print statement to generate a carriage return. This puts the second input on the next line.

Line 540 starts this process over for the second input, changing the valid character set and the maximum input length.

Limitations and Improvements

The Input routine performs much like the LINEINPUT statement. On a single call you can set only one variable, and you can only set strings. But you can convert BF\$ to its numeric equivalent with VAL(BF\$).

To improve the program, you might add the capability to erase a line with one keystroke, as you can with Input and LINEINPUT. Finally, you might modify the routine to control the exact input length for entering dates, phone numbers, and so on. ■

José E. Anaya is a computer consultant and chief of the Department of Business Administration at the Universidad de Monterrey. Contact him at Fresnillo 224-A, Col. Mitrás Centro, Monterrey, NL 64460, Mexico.

System Requirements

Models I, III, 4, 1000, 1200, and 2000

32K RAM

Disk Basic



Related Articles

Alfred, Norma Jean. "Bus Stop," April 1982, p. 244. Model I utility that provides direct access to machine-language routines.

Bishop, Daniel R. "The Competition's Cursor," September 1980, p. 210. Gives Model I, Level II Basic a flashing cursor.

Byrnes, Christian F. "Formatted Screen Input," October 1981, p. 350. A technique that makes Model I data entry easier.

Decker, Jack. "Input with Insight," October 1980, p. 138. Correct the limitations of the Input command with the INKEY\$ function.

Mickey, Everett. "The Flasher," January 1982, p. 276. A flashing prompt routine for Model I programs.

Schweizer, G. "The Input Specifier," February 1983, p. 328. A Model II utility that specifies the input parameters by setting variables.

Smith, Roger A., Jr. "Easy Input," November 1984, p. 109. One line of code that helps you design formats for user input in your Model III Basic programs.

Wilde, Tim. "Versatile Input," September 1980, p. 98. A Model I utility that makes input more flexible.



You've spent a lot of time getting your TRS-80 Model I/III Basic Programs running right. If you think you need a newer machine to run them faster, think again! It's easy to accelerate your programs, just as they are. Compile them with ACCEL3/4.

ACCEL3/4 is famous for a unique trick. It compiles essential operations and controls the interpreter for the rest. Result: You can use the whole Basic language. You can compile big programs (25K+). And look at these speedups* . . .

Operation	Speed Improvement (Ratio)			
	INT	SNG	DBL	STR
Assignment (LET)	178	28	20	7.3
Array Reference (1-dim)	35	36	36	3.5
Array Reference (2-dim)	10	3.0	3.0	3.0
AND, OR	35	1.8	1.6	6.6
Compare (=, >, <, etc.)	23	2.0	1.6	3.6
Add, Concatenate (+)	57	1.8	1.4	3.6
Multiply (*)	48	1.8	1.3	1.1
Subtract (-)	1.5	1.5	1.1	1.1
Divide (/)	1.08	1.17	1.02	9.3
Constant Reference	77	70	84	9.3
FOR . . . NEXT	7.1	1.9	—	—
POKE	111	68	48	—
SET RESET	10	4.5	3.6	8.1
IF THEN ELSE	47	4.6	3.0	3.5
ON expression GOTO	33	3.3	3	5.1
ON expression GOSUB	50	6.8	5.1	—
PRINT simple-variable	1.2	1.01	1.03	1.2
OUT	61	5.0	3.7	—
Flow of Control		216	—	—
GOTO		74	—	—
GOSUB/RETURN		—	—	—
Functions		int	int	int
VARPTR		5.2	1.9	1.7
POINT		38	2.3	1.7
INP		149	2.3	2.0
PEEK		—	—	—
String Functions		53	—	—
ASC		298	4.8	—
LEN		—	4.7	—
LEFT\$		—	6.4	—
RIGHT\$		25	—	—
MIDS		36	—	—
CHR\$		16	—	—
CVI		7.1	25	—
MKIS		—	5.4	—
CVS		—	16	—
MKSS		—	—	—
CVD		—	—	—
MKDS		—	—	—

*Actually, ratios are even better in real programs.

So if you think you need a whole new computer to get performance improvements for your Basic programs, then think again. You need ACCEL3/4.

\$99.95 + \$2 s/h CA add 6%

■ (415) 681-9371 ■

Allen Gelder Software

Box 11721 San Francisco, CA 94101

Program Listing 1. Basic input routine.

```

10 REM *** THE CUSTOM INPUT ROUTINE ***
20 REM *** AUTHOR: JOSE E ANAYA P ***
30 REM *** 80 MICRO READERS ARE LICENSED TO USE THIS ***
40 REM *** BASIC CODE FOR PERSONAL USE. NOT FOR SALE. ***
50 CLEAR 1000: DEFINT I-N
60 BS$=CHR$(8): CR$=CHR$(13): PT$=CHR$(132)
70 REM *** VALID CHARACTER SETS ARE DEFINED ***
80 AU$="ABCDEFGHIJKLMNOPQRSTUVWXYZ.": NU$="0123456789"
90 REM *** GOTO MAIN PROGRAM ***
100 GOTO 500
110 REM *** KEYBOARD SCANNER ***
120 FOR X=1 TO 30: Z$=INKEY$: IF Z$<>"" THEN X=30
130 NEXT X: RETURN
140 REM *** BLINKING CURSOR SUBROUTINE ***
150 PRINT PT$,:GOSUB 120:PRINT BS$,:IF Z$<>"" THEN RETURN
160 GOSUB 120: IF Z$="" THEN 150 ELSE RETURN
170 REM *** INPUT BUFFER CONTROLLER ***
180 LN=0: BF$=""
190 GOSUB 150: IF Z$=CR$ THEN RETURN
200 IF Z$<>BS$ THEN 220
210 IF LN=0 THEN 190 ELSE LN=LN-1: BF$=LEFT$(BF$,LN): PRINT BS$:
: GOTO 190
220 IF INSTR(VD$,Z$)=0 OR LN=LM THEN 190 ELSE LN=LN+1:
BF$=BF$+Z$: PRINT Z$: GOTO 190

= = = = = OTHER LINES COULD BE HERE = = = = =
499 REM *** MAIN PROGRAM BEGINS ***
500 CLS
510 PRINT "TYPE CUSTOMER NAME: ";: VD$=AU$: LM=30
520 GOSUB 180: IF LN=0 THEN 520
530 CN$=BF$: PRINT
540 PRINT "TYPE CHECK NUMBER: ";: VD$=NU$: LM=5
550 GOSUB 180: IF LN=0 THEN 550
560 CK$=BF$: PRINT

= = = = = PROGRAM CONTINUES HERE = = = = =

```

End

Program Listing 2. Changes for the Models 1000 and 1200.

MODEL 1000/1200 CONVERSION

```

60 BS$=CHR$(29): CR$=CHR$(13): PT$=CHR$(8): SP$=CHR$(32)
150 PRINT PT$;BS$,:GOSUB 120:PRINT SP$;BS$,:IF Z$<>"" THEN RETURN
200 IF Z$<>PT$ THEN 220

```

End

Program Listing 3. Changes for the Model 2000.

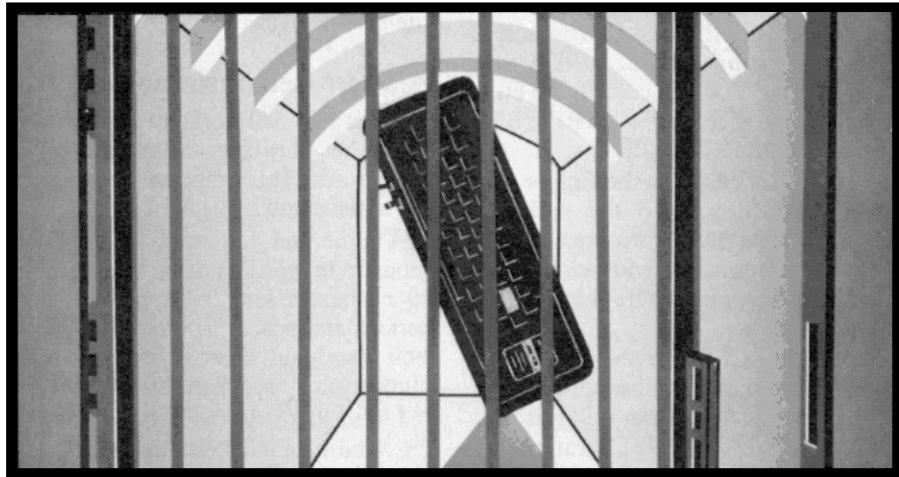
MODEL 2000 CONVERSION

```

60 BS$=CHR$(8): CR$=CHR$(13)
150 GOSUB 120: IF Z$<>"" THEN RETURN

```

End



From Computer Plus to YOU...

PLUS after **PLUS** after **PLUS**



Tandy 200 24K \$835
Model 100 8K \$339
Model 100 24K \$510



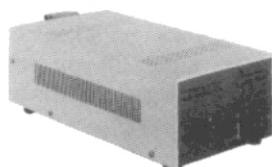
Color Computer II
W/16K Ext. Basic \$135
W/64K Ext. Basic \$179



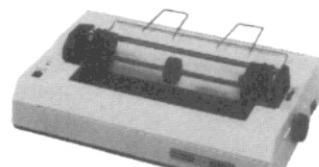
Tandy 1000 \$999
Tandy 1200 \$2195



Smith Corona L-1000
\$259



Color Computer Disk Drive
Drive 0 \$279 Drive 1 \$169



DMP105 \$160

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS

Tandy 1000 1 Drive	128K	999.00
Tandy 1200 10 Meg.	256K	2195.00
Tandy 2000 2 Drive	256K	2100.00
Tandy 2000 10 Meg.	256K	3350.00
Model IV Portable	64K	970.00
Model IV Desktop	64K	970.00

PRINTERS

Radio Shack DMP-110	299.00
Radio Shack DMP-430	660.00
Radio Shack DWP-210 Daisy Wheel	489.00
Radio Shack TRP-100 Portable	229.00
Silver Reed EXP-550 Daisy Wheel	430.00
Star Powertype Daisy Wheel	345.00
Star SG-10	245.00
Star SG-15	410.00
Star SD-10	365.00
Panasonic P-1091	315.00
CITOH Prowriter 8510AP	320.00
CITHO 7500	230.00
Okidata 92	389.00
Okidata 93	625.00
Epson	CALL

Tandy 1000 / 1200 ACCESSORIES

Tandy 1000 Disk Drive Kit	215.00
256K Ram Board (Inc. 128K & DMA)	245.00
512K Ram Board (Includes 128K)	205.00
128K Ram Upgrade Kit (Tandy)	135.00
128K Ram Upgrade Kit (NEC)	98.00
300 Baud Modem Board	145.00
RS-232 Serial Board	89.00
Hard Disk Controller Board	265.00
Digi-Mouse/Clock Board	89.00
Tandy VM-2 Green Monitor	139.00
Tandy CM-2 RGB Color Monitor	449.00
Tandy VM-3 TTL Green Monitor	179.00
Tandy 1200 Text Monitor Adapt.	179.00
Tandy 1200 Color/Graphics Adapt	240.00

MODEMS

Radio Shack DCM-3	52.00
Radio Shack DC Modem IB	89.00
Radio Shack DC Modem II	160.00
Radio Shack DC Modem 2212	315.00
Hayes Smartmodem II 300 Baud	215.00
Hayes Smartmodem 1200 Baud	429.00
Novation J-Cat 300 Baud	115.00

MODEL III / IV ACCESSORIES

PTC-64K Printer Buffer	199.00
Model III/IV Drive 0 Kit	465.00
Model III/IV Drive 1 Kit	220.00
Model III/IV Hi-Res Board	229.00
Model III/IV RS-232 Board	99.00
Model IV 64K Upgrade Kit	79.00

FOR EVERYONE

Radio Shack Powerline Filter	45.00
CCR-81 Cassette Recorder	52.00
CCR-82 Cassette Recorder	43.00
C-20 Digital Cassette Tapes (10pk)	9.95
Verbatim SSDD Plastic Box (10pk)	24.95
Verbatim DDDD Plastic Box (10pk)	34.95
Generic SSDD Diskettes (10pk)	17.95
NEC 64K Ram Chips (set of 8)	49.00
Radio Shack 16K Ram Chips (8)	25.00
Locking Disk Box (holds 70)	19.95
Flip N File Disk 50	15.00
Fanfold CleanEdge Paper (2600)	35.00

Radio Shack software 10% off.

Send for complete listing of
brand name software and hardware.

**CALL TOLL FREE
1-800-343-8124**

- LOWEST POSSIBLE PRICES
- BEST POSSIBLE WARRANTY
- KNOWLEDGEABLE SALES STAFF
- TIMELY DELIVERY
- SHOPPING CONVENIENCE



computer
plus

P.O. Box 1094
480 King Street
Littleton, MA 01460

SINCE 1973

IN MASSACHUSETTS CALL (617) 486-3193

Stationary Department

Protect up to seven lines at the top of your Model 4 screen.

I love my Model 4, but I wish it had the Model III's scroll-protect feature. While scroll protection is available on the Model 4, you can only invoke it with a machine-language routine. Because TRSDOS 6.X doesn't include a command to easily access this option, I decided to write a short routine, Scroll, to do so.

Scroll lets you scroll-protect up to seven lines at the top of your Model 4's video screen. And you can run the program from TRSDOS Ready or incorporate it anywhere in a Basic program.

Using Scroll

Scroll resides on disk, in the memory area that begins at 2600 hexadecimal.

To use Scroll, type in the Assembly-language code in Program Listing 1. If you don't have an ALDS assembler, change line 130 to ORG 2600H. Then save the program to disk and assemble it.

If you're not using an editor/assembler, type in the Basic program (Program Listing 2). Listing 2 creates an executable machine-language file on disk that's identical to the machine-language file my editor/assembler produces.

To run the Assembly-language program from TRSDOS Ready, type in SCROLL (LINES=n), where n is the number of lines (up to seven) you want to scroll-protect. To run the program from Basic, type in SYSTEM "RUN SCROLL (LINES=n)". You can abbreviate LINES, the parameter name, to L, which you can use anywhere in a Basic program.

Scroll considers the parameter n as modulo 8, meaning that if you specify LINES=8, Scroll translates that as a zero. Similarly, it interprets LINES=9 as a 1, and so on.

The LINES=n parameter accepts only numeric input; if you enter any other value, you'll get an error message.

Because Scroll resides on disk, it's not nearly as fast as a simple POKE from Basic, but unless you plan to constantly change the number of protected

lines within a single program, speed shouldn't be a major factor. ■

Contact Raymond C. Boggs at 4735 Feigley Road SW, Port Orchard, WA 98366.

Related Article

Keller, M. "As the Screen Scrolls," February 1982, p. 264. Scroll protection for the Model 1.

Program Listing 1. Source Listing for Scroll in ALDS 03.02.00 format.

```

00100 @DSPPLY EQU    0AH      ;DEFINE MESSAGE LINE DISPLAY SVC
00110 @PARAM  EQU    11H      ;DEFINE PARAMETER PARSE SVC
00120 @VDCCTL EQU    0FH      ;DEFINE VIDEO CONTROL SVC
00130 PSECT   2600H    ;START PROGRAM IN OVERLAY AREA
00140 SCROLL  LD     A,@PARAM ;LOAD @PARAM SVC NUMBER
00150          LD     DE,PTABLE ;LOAD 'DE' WITH PARAMETER TABLE
00160 RST     28H      ;GO PARSE PARAMETER FROM COMMAND LINE
00170 JR      NZ,ERROR ;ERROR ON RETURN - DISPLAY ERROR...
00180
00190 LD     A,(RESP) ;MESSAGE & RETURN.
00200 AND   80H      ;GET RESPONSE CODE
00210 JR      Z,ERROR ;TEST FOR PROPER RESPONSE
00220 LD     A,(LINES) ;IMPROPER RESPONSE - GO PRINT ERROR MESSAGE
00230 LD     C,A      ;EVERYTHING OK - GET USER'S INPUT VALUE...
00240 LD     A,@VDCCTL ;INTO 'C'.
00250 LD     B,07H    ;LOAD VIDEO CONTROL SVC
00260 RST     28H      ;LOAD VIDEO CONTROL FUNCTION
00270 LD     HL,0000H ;GO SCROLL PROTECT LINES
00280 RET
00290 LD     A,@DSPPLY ;SET HL FOR NO ERROR ON RETURN
00300 LD     HL,ERRMES ;RETURN TO CALLER
00310 RST     28H      ;POINT 'HL' TO ERROR MESSAGE
00320 LD     HL,0000H ;GO DISPLAY MESSAGE
00330 RET
00340 ERRMES DEFN  'Parameter error' ;ERROR MESSAGE
00350 DEFB   0DH      ;MESSAGE TERMINATOR
00360 ****
00370 ;** TABLE OF PARAMETER TYPE BYTES, PARAMETER NAMES, AND **
00380 ;** RESPONSE TYPE & LENGTH RETURNED BY THE @PARAM SVC.   **
00390 ****
00400 PTABLE DEFB   80H      ;PARAMETER TABLE HEADER CODE
00410 DEFB   10010000B+05H ;BIT 7 = ACCEPT NUMERIC VALUE...
00420          DEFB   05H      ;BIT 4 = ACCEPT ABBREVIATED PARAMETER NAME...
00430          DEFB   05H      ;05H = LENGTH OF PARAMETER NAME.
00440 DEFM   'LINES'   ;PARAMETER NAME
00450 RESP   DEFB   00H      ;RESPONSE BYTE : TYPE & LENGTH OF RESPONSE
00460 DEFW   LINES    ;POINT TO # LINES TO SCROLL PROTECT,....
00470          DEFB   00H      ;AS CONVERTED & STORED BY THE @PARAM SVC.
00480          DEFB   02H      ;END OF PARAMETER TABLE
00490 LINES  DEFS   SCROLL ;AREA TO RECEIVE # LINES TO PROTECT
00500 END

```

End

System Requirements

Model 4



64K RAM

Assembly language or Disk Basic

TRSDOS 6.X

Editor/assembler optional

Program Listing 2. Basic program that creates Scroll from Basic.

```

10 OPEN "O",1,"SCROLL/CMD"
20 FOR X=1 TO 95 : READ Y : A$=A$+CHR$(Y) : NEXT X
30 PRINT #1, A$;
40 CLOSE 1
50 END
100 DATA 5,9,0,0,0,83,67,82,79,76,76,5,9,0,0,38,32,32,32,32,32,32
110 DATA 1,67,0,38,62,17,17,54,38,239,32,20,58,61,38,230,128,40,13
120 DATA 58,65,38,79,62,15,6,7,239,33,0,0,201,62,10,33,38,38,239,33
130 DATA 0,0,201,80,97,114,97,109,101,116,101,114,32,101,114,114,111
140 DATA 114,13,128,149,76,73,78,69,83,0,65,38,0,2,2,0,38

```

End

YOU CHOOSE:

	MLINK	Crosstalk XVI	Smartcom II
Terminal Emulation Mode			
Menu-driven Interface	Yes	Yes	Yes
Expert/brief Command Mode	Yes	Yes	
Extensive Help Facility	Yes	Yes	Yes
Directory-based Autodialing	Yes		
Automatic Logon	Yes	Yes	Yes
Programmable Function Keys	Yes	Yes	
Multiple Modem Support	Yes	Yes	
File Transfer Mode			
Error Checking Protocol	Yes	Yes	Yes
Wildcard File Transfers	Yes	Yes	Yes
File Transfer Lists	Yes		
XMODEM Protocol Support	Yes	Yes	Yes
Mainframe Versions Available	Yes		
Command Language			
Conditional Instructions	Yes	Yes	
User Variables	Yes		
Labels	Yes	Yes	
Fast Interpreted Object Code	Yes		
Program Run	Yes	Yes	
Subroutines	Yes		
Arithmetic and String Instructions	Yes		
Debugger	Yes		
Miscellaneous			
Remote Access	Yes	Yes	Yes
Electronic Mail	Yes		
Unattended Scheduling	Yes	Yes	
Expandable Interface	Yes		
CP/M Versions Available	Yes		

MLINK™

The choice is easy. Our MLINK Data Communications System is the most powerful and flexible telecommunications software you can buy for your personal computer. And it's easy to use. MLINK comes complete with all of the features listed above, a clear and comprehensive 275-page manual, and 21 applications scripts which show you how our unique script language satisfies the most demanding requirements.

Choose the best. Choose MLINK.



Corporate Microsystems, Inc.
P.O. Box 277
Etna, NH 03750
(603) 448-5193

Please send me the following version(s) of MLINK:

- Tandy Model 1000/1200 (MS-DOS)
- Tandy Model 2000 (MS-DOS)
- Tandy Model 4 or 4P (CP/M Plus only)
- IBM® PC or compatible (PC-DOS)
- Send me more information

Other versions are also available.
Please call for current version information.

Introductory offer - we pay shipping!
Include \$250.00 for each copy of MLINK.
Outside North America add \$15.00 (U.S.)

Check enclosed MasterCard Visa
 COD (Registered checks or money orders only)

Card # _____ Exp. _____

Signature _____

Ship to:

Name _____

Address _____

City/State/Zip _____

KAYPRO **NEC**
3M • **SANYO**

IBM • **Hayes**



TOLL FREE 1-800-321-3552
IN OHIO & OTHER INQUIRIES 216-481-5515

star **EPSON**
OKIDATA BASF
Datalife
Verbatim.

IF ANYTHING BEAT'S OUR SELECTION, IT'S OUR PRICES!

YOUR REFERENCE GUIDE FOR TANDY 1000 - IBM - IBM COMPATIBLES

UPGRADES

64K Memory 4164'S	\$ 39.95
16K 4116, 200NS	17.95
AST Six Pack Plus 0K	225.00
AST Six Pack Plus 64K	278.00
Quadram Quadboard 0K	219.00
Quadram Quadboard 64K	269.00
Quadram Quadcolor	219.00
Persyst Graphics Brd	229.00
Persyst Mono/Parallel	249.00
Hercules Graphics Board	359.00
Techmar Color/Parallel	339.00

MONITORS

Amdak 300 Green	\$149.00
Amdak 300 Amber	159.00
Amdak 310 Amber	199.00
Zenith 122A	109.00
Zenith 124A	159.00
Quadram Quadchrome	
RGB	499.00
Taxan 420 RGB	499.00

MODEMS

Hayes Smartmodem 300	\$205.00
Hayes Smartmodem 1200	449.00
Hayes Smartmodem 1200B	399.00
Hayes Micromodem IIe	269.00
Signalman Mark VII	109.00
Signalman Mark XII	299.00
Popcom X100	399.00
Popcom C100	379.00

DISKETTES

3M

5 1/4" 1S/DD/SS - Box of 10	\$19.95
5 1/4" 2S/DD/SS - Box of 10	26.95
Purchase 10 boxes of disks and you pay only	\$18.95 per box

Verbatim

5 1/4" MD25-01 IS/D Den (box of 10)	\$19.95
5 1/4" 2S/D Den (MD550-01)	26.95
5 1/4" 2S/4 Den (MD557-01)	49.90
8" 1S/D Den (FD34-8000)	43.95

IBM
PCX
10 MEGABYTE HARD DRIVE

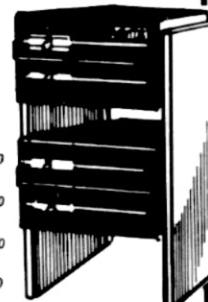
NOW ONLY **\$2995**

Includes MDS controller, 10 megabyte hard drive and memory, CPU, IBM keyboard, 256K RAM, mono-/parallel board, monitor and single 320K floppy drive. Easily expandable.

DISKIT III™

MODEL III & IV DISK UPGRADE

As low as
\$199



DISKIT III w/o Drives ... \$199.00

DISKIT III w/one Teac 55A 40 Track Drive ... \$345.00

DISKIT III w/two Teac 55A 40 Track Drive ... \$495.00

DISKIT III w/two Teac 55B 40/40 Dual Drive ... \$595.00

ADD \$10.00 EA. FOR TANDON DRIVES

NOW ADD UP TO 4 INTERNAL DISK DRIVES TO A RADIO SHACK MODEL 3 & MODEL 4, UP TO 1.3 MEGABYTES OF DISK STORAGE!
• Gold Plated Edge Connectors • Metal Disk Drive Brackets • All Hardware and Cables • Switching Power Supply • 1 hour or less for installation • 40 80 Track supported • Single Dual head supported • 100% compatible • No Soldering needed • 180 days warranty on Controller.

MODEL III & IV

RS-232 Communication

RS-232 ... \$59.95

Direct replacement for RS-232, fully tested and burned in, easy installation, 120 day warranty.

SOFTWARE-IBM

DBase II	\$329.00
DBase II - DBase III Upgrade	150.00
DBase III	499.00
Framework	499.00
Dollars & Sense	129.00
Flight Simulator	39.00
Knoware	79.00
Lotus 123	329.00
Lotus 123 - Symphony Upgrade	150.00
Lotus Symphony	499.00
Masterype	39.00
Microsoft Word w/Mouse	319.00
Multimate	329.00
Open Access	389.00
PFS:Access	69.00
PFS:File	99.00
PFS:Proof	69.00
PFS:Report	99.00
PFS:Write	99.00
RBase 4000	349.00
RBase Clout	145.00
RBase Extended Report	109.00
Wordstar	239.00

DRIVES

TEAC 55A 40 TRK	\$149.00
TEAC 55B 40/40 TRK	199.00
Tandon TM100-1 40 TRK	149.00
Tandon TM100-2 40/40 TRK	219.00
Tandon TM100-4 80/80 TRK	319.00
Datamac 10 Megabyte	999.00
Datamac 30 Megabyte	1949.00
10 Meg Internal Drive w/Controller	679.00

DRIVE PARTS FOR TANDON, TEAC, MPI CALL FOR PRICES!

**TANDONS \$2995
DRIVES REPAIRED**

Plus Parts & Shipping

ADD \$3.00 FOR
SHIPPING
& HANDLING
\$6.00 Extra for
C.O.D. Orders
Ohio Residents
Add 6 1/2% Sales Tax

micco
DATA SUPPLIES

22295 Euclid Ave.
Euclid, Ohio 44117



WE ACCEPT
• Visa
• Mastercard
• Checks
• Money Orders
• C.O.D.

IF ANYTHING BEATS OUR SELECTION IT'S OUR PRICES!



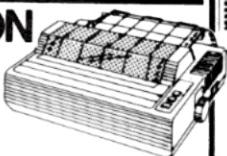
EPSON

RX80
\$229

- 100 cps
- Tractor paper feed
- 128 Typestyles
- 7 graphic modes
- Proportional space
- 10" carriage

EPSON

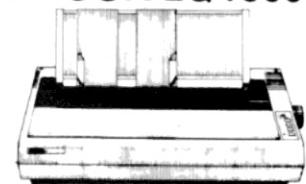
FX100
\$619



- 160 cps
- Tractor paper feed
- 128 Typestyles
- 7 graphic modes
- Proportional space
- 15" carriage

EPSON FX80
160 CPS,
10" carriage ... \$409

EPSON LQ 1500



includes parallel interface, 200 CPS, bi-directional, sheet feeders available. \$1169

VERSABUSINESS SERIES

The Most Powerful Business Software Ever!

Model I, III & IV

VERSA RECEIVABLES	\$84.95	VERSA PAYROLL	\$84.95
VERSA PAYABLES	\$84.95	VERSA INVENTORY	\$84.95
VERSA LEDGER II	\$129.95		



TOLL FREE 1-800-321-3552
IN OHIO & OTHER INQUIRIES 216-481-5515

When you call M.D.S. you receive the fastest delivery available anywhere. We now have a bigger and better facility to serve you in the most efficient way possible. Call us, you'll be glad you did.

Russ Krotto



CP/M

Exclusively for the
Model 4
Montezuma Micro

- Includes INTERCHANGE: a utility that allows reading, writing and copying 20 different manufacturer's disk formats such as IBM, KAYPRO, OSBORNE, XEROX, etc.
- Complete with the following CP/M utilities: ASM, DDT, DUMP, ED, LOAD, PIP, STAT and SYSGEN.
- Includes MODEM 7, a powerful public domain communications program for file transfer and remote data base access.
- Supports 80 x 24 video, reverse video, direct cursor addressing and more.
- Utilizes the Model 4 function keys and allows user defined keys.
- Auto execute command for turnkey applications.
- FORMAT utility permits up to 52 disk formats to be constructed, all menu driven.

\$159.95

ELECTRIC
WEBSTER

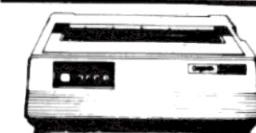
Complete
System \$189.

Le Script
Model I-III & IV

\$104.95

NEWDOS/80
Version 2.0

MOD I or III \$89.95



OKIDATA 92

The most advanced
dot matrix printer
in its price range.

\$399



OKIDATA 93

- 160 cps
- Tractor paper feed
- Proportional space
- 15" carriage

\$629



COMREX II

13 CPS Printer \$349

COMREX III	\$629
OKIDATA 82	\$319
OKIDATA 93	\$629
OKIDATA 84	\$709
BROTHER HR15	\$379
BROTHER HR25	\$649
BROTHER HR35	\$879
BROTHER 2024L	\$969
PANASONIC 1090	\$235
PANASONIC 1091	\$315
PANASONIC 1092	\$445
PANASONIC 3151	\$535
TOSHIBA 1340	\$599
TOSHIBA 1351	\$1359

THE HOME ACCOUNTANT

The #1 best selling program for home and small business accounting is now available for TRS-80 Model 3. Handles up to 99 accounts, five checkbooks, multiple income accounts, and can split transactions to any number of accounts. Prints net worth statements, income statements, as well as custom designed reports. Displays a bar chart and trend for any selected category. (by Continental Software, requires Model 3, 2 drives, 48K).

PRINTER BUFFERS

FOR MOST COMPUTERS

QUADRAM MICROFAZER

Parallel to Parallel w/8K	\$149.00
Parallel to Serial w/8K	\$179.00
Serial to Serial w/8K	\$179.00
Serial to Parallel w/8K	179.00
Each Add's 8K Upgrade	\$ 10.00

All come with pause control and copy feature, and can be upgraded to 512K.

SPRINTER

Double Your Speed

Speed-up cuts computer operation time in half, saves time and money. Fast 4 MHz Z80B CPU included, installs in 15 minutes with no soldering or cutting.

SPRINTER III for MOD III	\$109.95
SPRINTER I for MOD I	\$109.95



BULK DISKETTES

99¢
ea.

SSSD IN QUANTITIES OF 200 OR MORE	\$1.29
SSDD	\$1.29

MODEL IV — 64K

MEMORY EXPANSION

Guaranteed 1 full year

Set of 8

4164 RAM CHIPS

\$39.95

w/PAL CHIP to go from

64 to 128K

\$64.95

16 K RAM SPECIAL

MEMORY UPGRADE

4116, 200ns. Guaranteed one full year.

\$17.95

NOW ONLY \$11.95

with the purchase of \$25 or
more! (while supply lasts)

MICCO
DATA SUPPLIES

A SUBSIDIARY OF THE COMPUTER WAREHOUSE, INC. OF OHIO

Prices, Specifications, Offerings,
subject to change without notice.

WE'RE GIVING
MAIL ORDER
A GOOD NAME!

Coming Together: Building The CMOS Computer

Last month (p. 82), I described the component parts of a CMOS (complimentary metal oxide semiconductor) single-board computer. This month, I'll explain how to build and operate the computer.

Building the DR800 Board

I've developed a printed circuit (PC) board for this project, and it's available as indicated in the parts list I included in April's column (p. 85). The schematics for the DR800 board are shown in Figs. 4a, 4b, and 4c (Figs. 1-3 appeared last month). Most of the parts are readily available. You can substitute special parts (like the specific type of reset switch) as required.

The board uses a 2 MHz NSC800 microprocessor. NSC800's are also available in 1 MHz and 4 MHz versions. The DR800 isn't designed to operate at 4 MHz, but you can operate it at 1 MHz if desired. Processor speed is one-half the crystal frequency, so a 2 MHz crystal can be used for 1 MHz operation. You might wonder why anyone would want to operate at a slower frequency. Besides being less expensive (for the 1 MHz NSC800), it draws less power because the processor operates slower; a 1 MHz processor uses significantly less current than a 2 MHz processor.

All of the logic chips, except the bus interface chips, use high-speed CMOS (HC) logic. This is a relatively new logic family having speeds similar to low-power Schottkey (LS) logic, with the power consumption of CMOS. You don't need to install the bus interface chips U35, U29, U31, and U32, (or the RP4 resistor pack) if you're not using the Multibus interface.

The bus offers several jumper-selectable memory options as far as RAM and ROM installations. I'll describe them in the operations section.

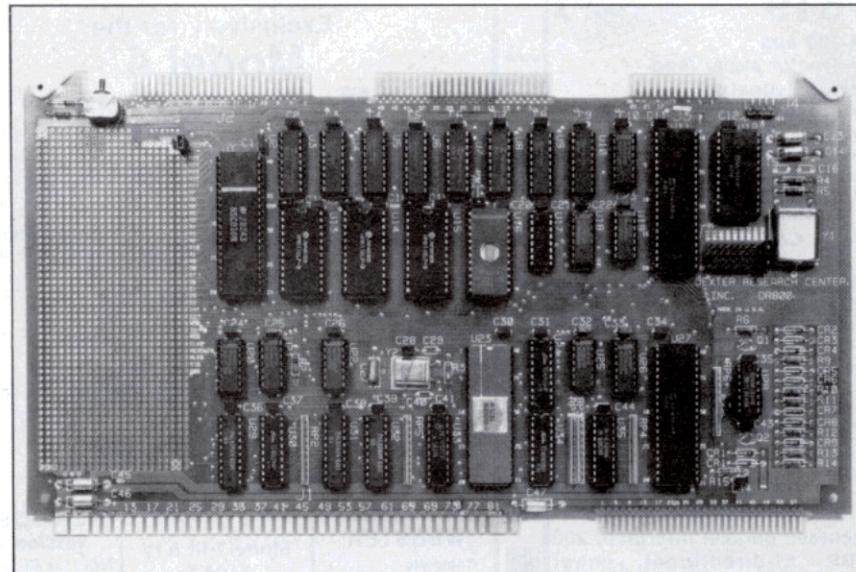


Photo. The DR800 single-board computer.

Connector J1 is the 86-pin Multibus connector, connector J2 is the 50-pin I/O connector and connector J3 is the 26-pin serial I/O connector. These connectors have odd-numbered pins on one side, and even-numbered pins on the opposite side.

You have a little versatility concerning power supply requirements. You need a +5V supply at 40 milliamperes (mA) to run the board. You'll also use the +5V supply as the positive RS-232C voltage. A negative RS-232C voltage (at 5mA) is also required. Although a -5V supply is specified, any voltage between -5V and -12V can be used.

Operating the DR800 Board

I chose the J2 connector for external device control, as well as I/O device expansion, if desired. The pinout for the J2 connector is shown in Fig. 5. As shown, all of the signals for I/O device expansion are available, as well as most of the NSC810 signals.

The J3 serial I/O connector pinout is shown in Fig. 6. I used serial port zero as the terminal interface and serial port 1 as the host interface, when using the available DR800 monitor (described below). Note that these are bare-bones ports, lacking any handshaking lines.

You should interface the NSC810 to other devices through the J2 I/O connector, though you can also interface it with circuitry built on the board's prototyping area. It provides a jumper option for the signal into the NSC810's timer zero input (pin 3). One source is the 2 MHz buffered processor clock, the other is a line on the J2 I/O connector, to allow an external device to control the line.

If you're using the PC board, you might find the prototyping area useful for trying out different circuits. All necessary microprocessor signals are available on pads next to the prototyping area, making memory and I/O device addressing and interfacing

PROJECT 80

straightforward. Power and ground buses are also available at the prototyping area.

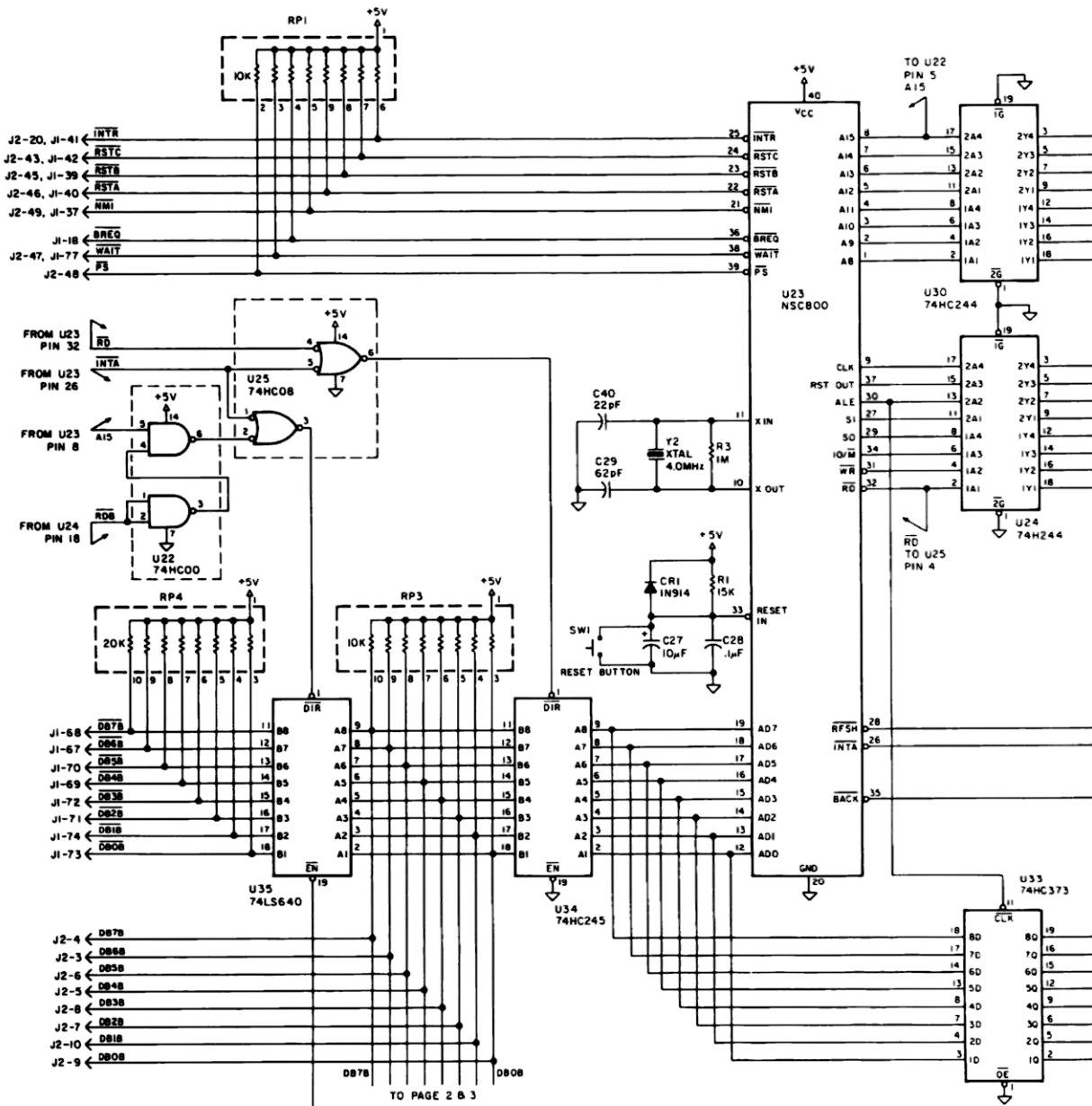
You can select the amount and type of memory used based on the requirements of your particular application. There are eight sockets for 6514-type 4K-bit RAM chips, which are nibble-wide. You can, therefore, add these chips in 1K increments as needed (one pair of 6514s at a time), to a maximum of 4K of 6514s. You can also use 2114-type NMOS RAMs in these sockets, though with greater power consumption.

The DR800 provides four 24-pin

JEDEC sockets for ROM and, optionally, additional RAM. The first socket is wired to always be a ROM socket, since the microprocessor boots from this area (location 0000 hex) on reset. The remaining three sockets each have a jumper to select the socket for RAM or ROM operation. If you choose RAM operation, you can use a 6116-type CMOS RAM (2K) in the socket. If you select ROM operation, you can use either a 27C16 (or 2716 with higher power consumption) or a 27C32 (or 2732A with higher power consumption) EPROM in the socket, depending on other jumper configurations.

Each of the four sockets will take up either 2K or 4K of address space, depending on whether you pick 2716 mode (2K) or 2732 mode (4K). To select 2716 mode, you have to jumper the 2716/2732 jumper to the 2716 setting, and remove the 2732 select jumper. Similarly, to select 2732 mode, you have to jumper the 2716/2732 jumper to the 2732 setting, and the 2732 Select jumper must be in place.

Note that while you can put the 4K ROMs in the sockets, you can only put 2K byte RAMs in the sockets. If you put a 6116 RAM device into a socket



PROJECT 80

jumpered for RAM while the board is set for the 2732 mode, the RAM will be double-addressed at the lower 2K and the higher 2K addresses.

You can use this to advantage. Suppose you need 4K more RAM (more than the 6514s provide), but you're also using 2732-type EPROMs. By putting a 6116 RAM chip into each of the higher-order JEDEC sockets, you can use the higher 2K addressing for the lower RAM and the lower 2K addressing for the higher RAM to get 4K of contiguous RAM space.

You should note that addressing any memory in the 0000-7FFF hex

range is reserved for on-board use, while addressing in the range 8000-0FFFF hex is reserved for off-board (or patch area) use. Likewise, I/O port addresses 00-7F hex are used on-board, while addresses 80-OFF hex are addressed off-board (or in the patch area).

If you address the upper memory or I/O through the patch area or the J2 I/O connector, you should remove U35 to prevent bus conflicts with the Multibus buffer.

I used a clever circuit to allow both 2K and 4K socket addressing. Chip U17 (74HC157) is a quad 2-to-1 switch

that switches the address lines going to the U18 (74HC138) address decoder chip, when inserting or removing the 2732 select jumper. This changes the address range on the address decoder outputs between 2K and 4K, as desired.

The 6402 UARTs are fairly simple devices and have been around for some time. I chose them because they're readily available, inexpensive, and simple to use. Since the control and status bits are signals brought out to the package pins instead of internal registers, you have to create the effect of a control register and a status regis-

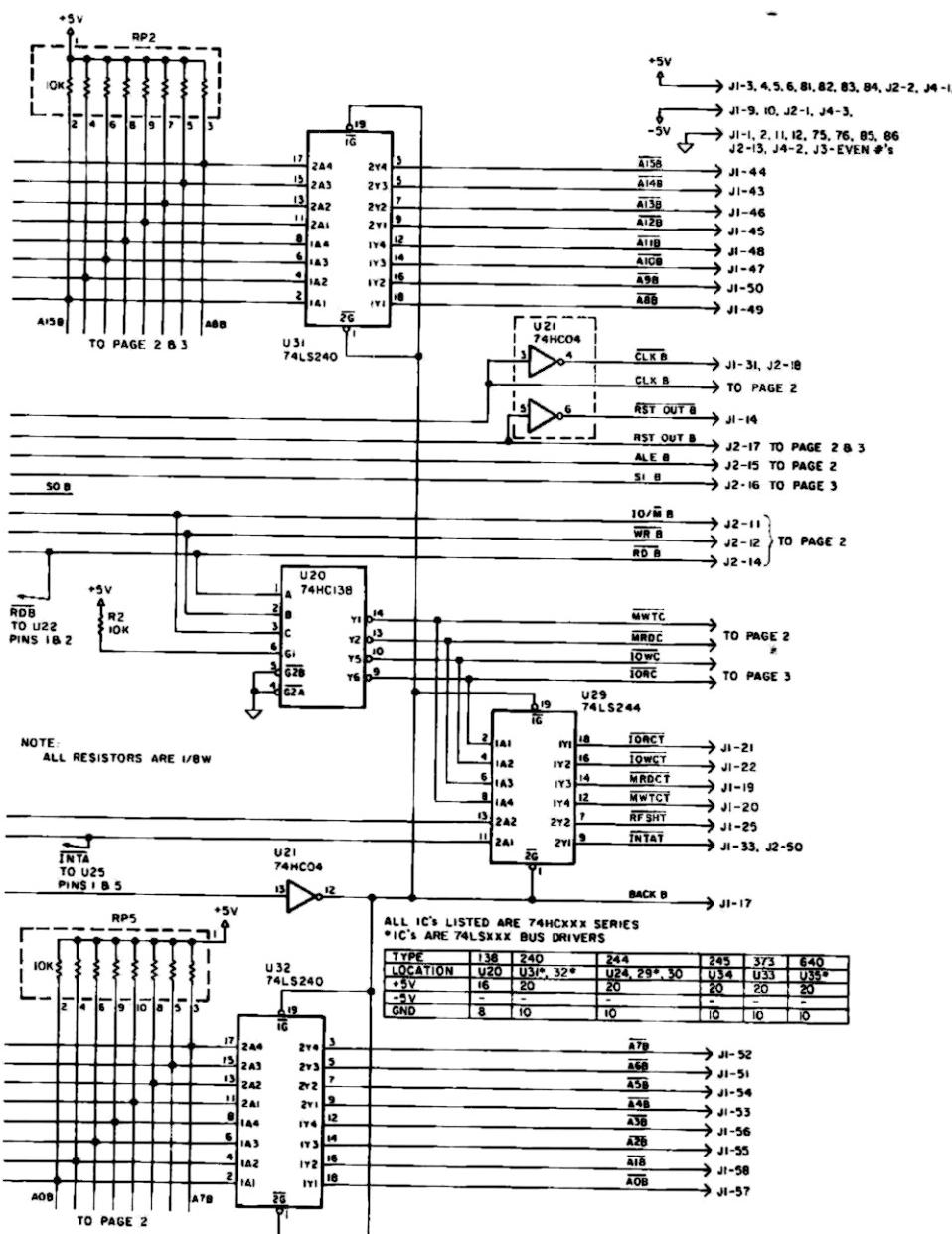


Figure 4a. DR800 single-board microprocessor.

PROJECT 80

ter by the design. This also means that no standard bit sequence for these registers is available, so I had to create my own.

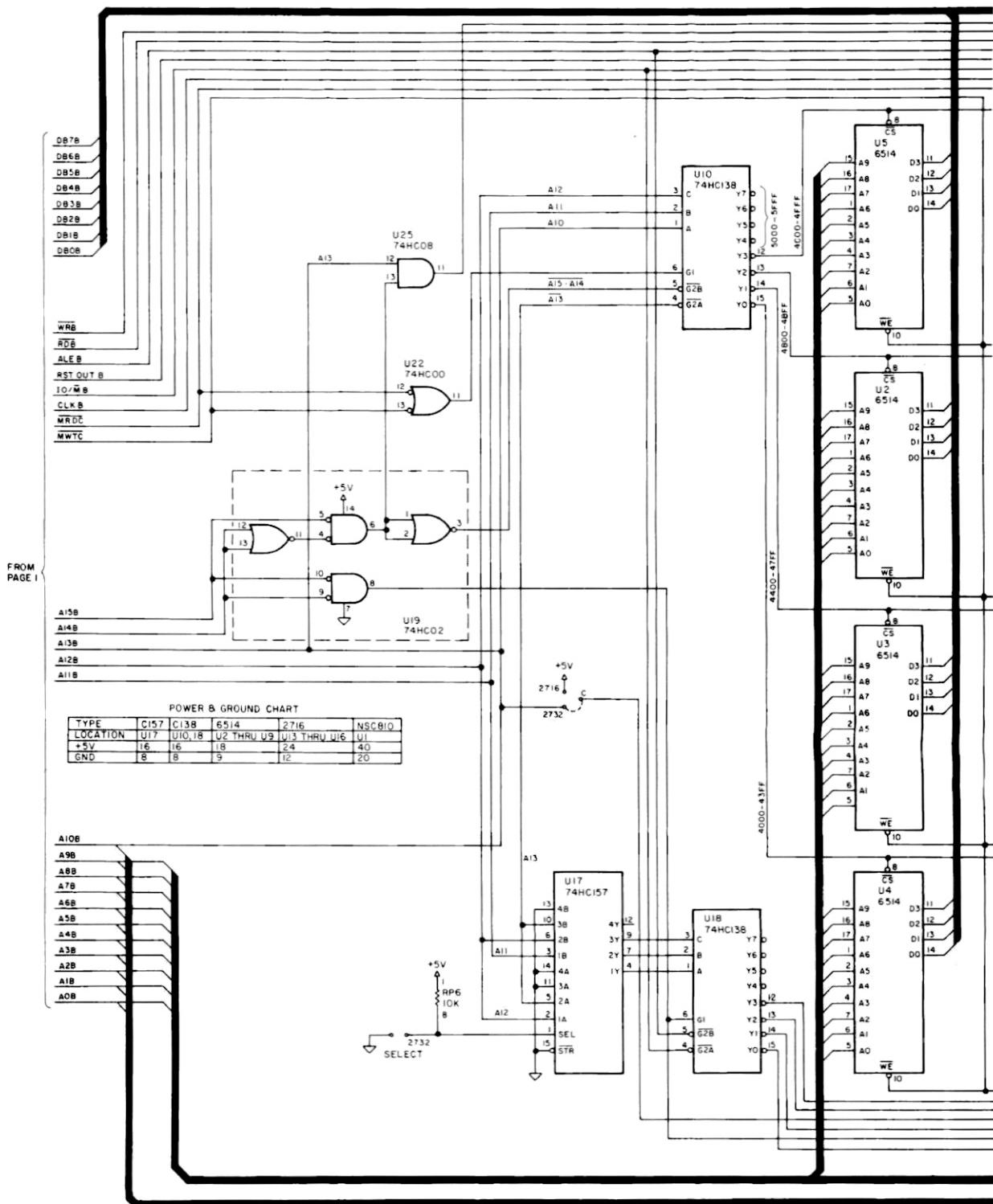
The 6402 control register is shown in Fig. 7, while the 6402 status register is shown in Fig. 8. These registers are designed to act as typical UART registers; thus, for example, the data

register ready signal is automatically deactivated when the processor reads the received data byte. Refer to the manufacturer's data sheet for more information on using the 6402 UART.

The MC14411 (U12) is a CMOS baud-rate generator, used to generate the baud rates for the two UARTs.

The baud rates are individually jumper-selectable. Merely jumper the desired baud rate frequency from the MC14411 to the appropriate UART clock line to set its baud rate.

Table 1 shows the memory and I/O addressing map for the on-board DR800 functions. Use this to access the memory and I/O devices.



PROJECT 80

The DR800 Monitor

I've written a reasonably extensive monitor program for the DR800 board (the DR800 monitor). This monitor takes up most of a 27C32 EPROM, and provides functions that let you look at and alter memory and I/O locations, set breakpoints, run programs, see NSC800 registers,

download programs from a host system, and do other development operations. Because of the length of the program, it's impractical to include a listing here. A copy of the ROM with operating instructions is available from the author as described in the parts list. A documented source listing is also available for an additional \$5.

I will briefly describe the functions of the DR800 monitor so you can understand its function and the functions of the DR800 board more fully. Incidentally, the DR800 Monitor uses the 128 bytes of NSC810 RAM for variable and stack purposes, leaving all other memory space (aside from the 27C32) available for use as desired.

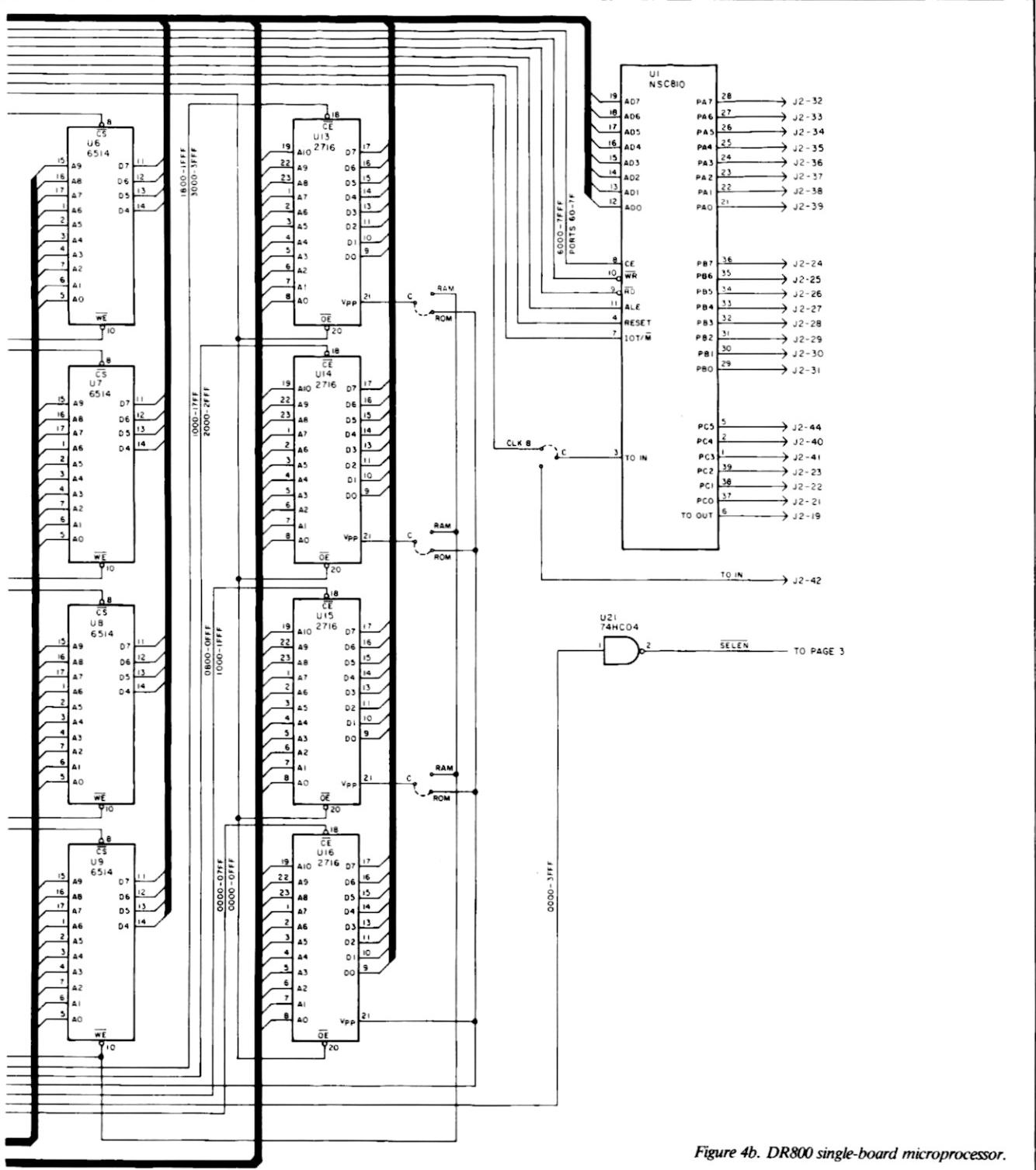


Figure 4b. DR800 single-board microprocessor.

PROJECT 80

Table 2 shows the commands available for the DR800 Monitor. The C (Communicate with the host) command allows the operator on the terminal line to communicate transparently to the host system through the host serial line. This is useful for initiating program downloads and editing files, etc. A control-T from the ter-

minal brings the operator back to the DR800 monitor.

The D (Display Memory) command lets you display a part of memory on the terminal. For example, the command D 100,1FF displays the memory in the range 0100-01FF hex in rows of 16 bytes. The starting address of the row appears at the beginning of each

screen line, and corresponding ASCII characters in the line, if any, are displayed at the end of each screen line.

The F (Fill Memory) command fills the specified memory range with a specified bit pattern. Zeros are the default if no bit pattern is specified.

The G (Go Execute) command starts program execution at the speci-

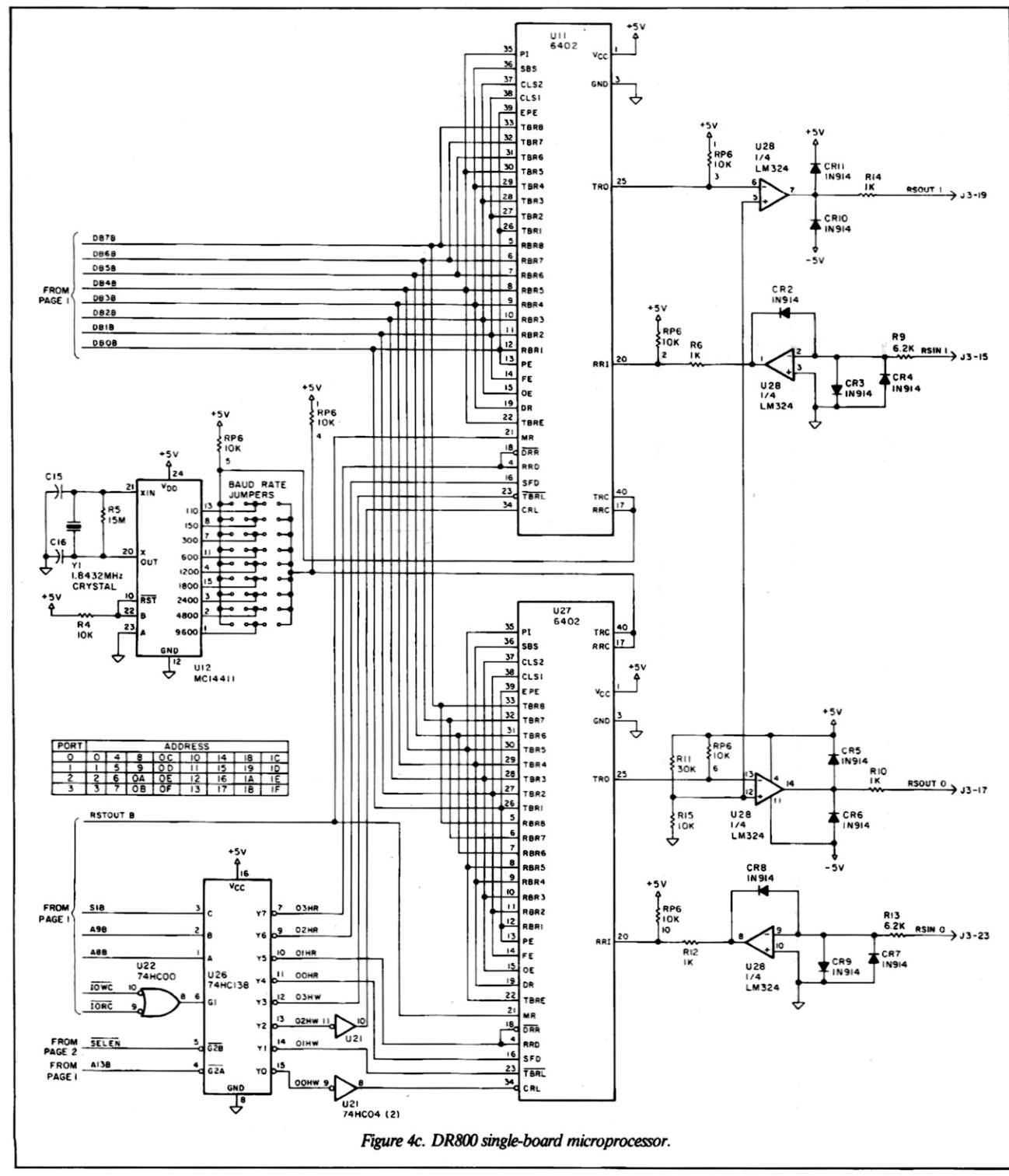


Figure 4c. DR800 single-board microprocessor.

From Computer Plus to YOU...

PLUS after PLUS after PLUS



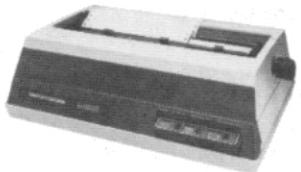
Tandy 200 24K \$835
Model 100 8K \$339
Model 100 24K \$510



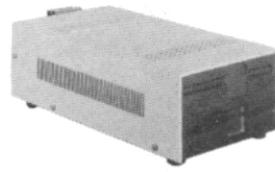
Color Computer II
w/16K Ext. Basic \$135
w/64K Ext. Basic \$179



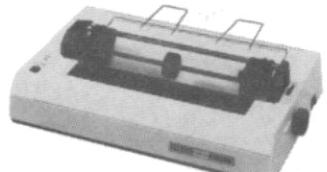
Tandy 1000 \$999
Tandy 1200 \$2195



Smith Corona L-1000
\$259



Color Computer Disk Drive
Drive 0 \$279 Drive 1 \$169



DMP105 \$160

BIG SAVINGS ON A FULL COMPLEMENT OF RADIO SHACK COMPUTER PRODUCTS

COMPUTERS

Tandy 1000 1 Drive 128K	999.00
Tandy 1200 10 Meg. 256K	2195.00
Tandy 2000 2 Drive 256K	2100.00
Tandy 2000 10 Meg. 256K	3350.00
Model IV Portable 64K	970.00
Model IV Desktop 64K	970.00

PRINTERS

Radio Shack DMP-110	299.00
Radio Shack DMP-430	660.00
Radio Shack DWP-210 Daisy Wheel	489.00
Radio Shack TRP-100 Portable	229.00
Silver Reed EXP-550 Daisy Wheel	430.00
Star Powertype Daisy Wheel	345.00
Star SG-10	245.00
Star SG-15	410.00
Star SD-10	365.00
Panasonic P-1091	315.00
CITOH Prowriter 8510AP	320.00
CITHO 7500	230.00
Okidata 92	389.00
Okidata 93	625.00
Epson	CALL

Tandy 1000 / 1200 ACCESSORIES

Tandy 1000 Disk Drive Kit	215.00
256K Ram Board (inc. 128K & DMA)	245.00
512K Ram Board (includes 128K)	205.00
128K Ram Upgrade Kit (Tandy)	135.00
128K Ram Upgrade Kit (NEC)	98.00
300 Baud Modem Board	145.00
RS-232 Serial Board	89.00
Hard Disk Controller Board	265.00
Digi-Mouse/Clock Board	89.00
Tandy VM-2 Green Monitor	139.00
Tandy CM-2 RGB Color Monitor	449.00
Tandy VM-3 TTL Green Monitor	179.00
Tandy 1200 Text Monitor Adapt.	179.00
Tandy 1200 Color/Graphics Adapt.	240.00

MODEMS

Radio Shack DCM-3	52.00
Radio Shack DC Modem IB	89.00
Radio Shack DC Modem II	160.00
Radio Shack DC Modem 2212	315.00
Hayes Smartmodem II 300 Baud	215.00
Hayes Smartmodem 1200 Baud	429.00
Novation J-Cat 300 Baud	115.00

MODEL III / IV ACCESSORIES

PTC-64K Printer Buffer	199.00
Model III/IV Drive 0 Kit	465.00
Model III/IV Drive 1 Kit	220.00
Model III/IV Hi-Res Board	229.00
Model III/IV RS-232 Board	99.00
Model IV 64K Upgrade Kit	79.00

FOR EVERYONE

Radio Shack Powerline Filter	45.00
CCR-81 Cassette Recorder	52.00
CCR-82 Cassette Recorder	43.00
C-20 Digital Cassette Tapes (10pk)	9.95
Verbatim SSDD Plastic Box (10pk)	24.95
Verbatim DDDD Plastic Box (10pk)	34.95
Generic SSDD Diskettes (10pk)	17.95
NEC 64K Ram Chips (set of 8)	49.00
Radio Shack 16K Ram Chips (8)	25.00
Locking Disk Box (holds 70)	19.95
Flip N File Disk 50	15.00
Fanfold CleanEdge Paper (2600)	35.00

Radio Shack software 10% off.

Send for complete listing of brand name software and hardware.

**CALL TOLL FREE
1-800-343-8124**

- LOWEST POSSIBLE PRICES
- BEST POSSIBLE WARRANTY
- KNOWLEDGEABLE SALES STAFF
- TIMELY DELIVERY
- SHOPPING CONVENIENCE



**computer
plus**
P.O. Box 1094
480 King Street
Littleton, MA 01460
SINCE 1973

IN MASSACHUSETTS CALL (617) 486-3193

PROJECT 80

fied address. You can also optionally specify a breakpoint. If you reach a breakpoint, you can see the register values with the X (Examine Registers) command.

The I (Input) command permits inputting from an input port (in I/O space). Similarly, the O (Output) command permits outputting a value to an output port (in I/O space).

The L (Load From Host) command

lets you download program object files in standard Intel hex/ASCII format from the host system to the DR800's memory for execution and debugging.

The M (Move Memory) command allows you to move a block of memory from one area to another.

The P (Put ASCII) command permits you to put ASCII characters in memory. For example, suppose you

want to put the words "I love Tandy" in memory starting at location 1000 hex. Simply enter the command P 1000 <CR>I LOVE TANDY <CTRL-D>, where <CR> is a carriage return and <CTRL-D> is a control-D. Use control-D to exit the put ASCII mode.

The R (RAM Test) command permits testing of board memory in specified address ranges, for any specified

<u>Pin #</u>	<u>Signal</u>
1	-5V supply
2	+5V supply
3	DB6B data bus lines
4	DB7B
5	DB4B
6	DB5B
7	DB2B
8	DB3B
9	DB0B
10	DB1B
11	IO-MB/
12	WRB/
13	GND
14	RDB/
15	ALEB
16	SIB
17	Reset out
18	CLKB/
19	TO OUT
20	INTR/ (NSC800)
21	PCO-INTR/
22	PC1-BF
23	PC2-STB/
24	PB7
25	PB6
26	PB5
27	PB4
28	PB3
29	PB2
30	PB1
31	PB0
32	PA7
33	PA6
34	PA5
35	PA4
36	PA3
37	PA2
38	PA1
39	PA0
40	PC4-T2IN
41	PC3-TG
42	TOIN
43	RSTC/
44	PCS-T1OUT
45	RSTB/
46	RSTA/
47	WAIT/
48	PS/
59	NMI/
50	INTAT/

Figure 5. J2 I/O connector pinout.

Memory Addressing:

0000H-3FFFH	JEDEC ROM/RAM sockets
4000H-4FFFH	6514 RAM
5000H-5FFFH	Reserved (not implemented)
6000H-607FH	NSC810 RAM
6080H-7FFFH	NSC810 RAM multiply addressed
8000H-FFFFH	Off-board addressing range

I/O Addressing:

00	UART 0 (U27) status/control ports
01	UART 0 (U27) data ports (input and output)
02	UART 1 (U11) status/control ports
03	UART 1 (U11) data ports (input and output)
04-5FH	Reserved (not implemented)
60-7FH	NSC810 I/O
80H-FFH	Off-board I/O addressing range

Table 1. DR800 memory and I/O addressing.

Pin # Signal

15	Serial port 1 data in (connect to DB-25S pin 2)
17	Serial port zero data out (connect to DB-25S pin 3)
19	Serial port 1 data out (connect to DB-25S pin 3)
23	Serial port zero data in (connect to DB-25S pin 2)

2-26 EVENS GND

All remaining pins are unused

Figure 6. J3 serial I/O connector pinout.

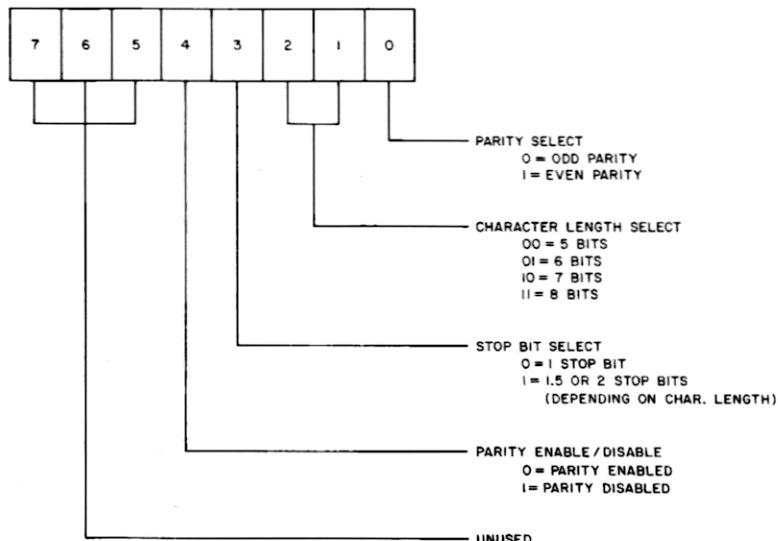


Figure 7. 6402 control register format.

There's only one newsstand in the entire world offering you this selection of great computer publications.



You're holding it.

That's right; you can get them all here. ***And at discounts.*** So browse. Whether you're new to computers, an experienced home/professional user or "in the business": order yours, today!

- Computerworld.** If you manage information, you can't manage without your own subscription. \$39 gets you 51 issues, plus 10 Special Focus publications. Save \$5.
- PC World.** The one publication that will grow with your growing PC needs. Helps you analyze financial/accounting data, manage complex projects, communicate results and plan. Now 12 issues for only \$17.97; you save \$5.78.
- InfoWorld.** The only way to stay on top of what's happening is by getting the **only** personal computing newsweekly. Authoritative. Objective. Easy to read. \$29.58 for 51 issues . . . only 58¢ an issue.
- InCider.** The Apple journal . . . and the **only** magazine devoted exclusively to the Apple family of computers. \$24.97 for 12 monthly issues. Save 30% off the cover price.
- Macworld.** The world's most creative computer demands a journal that's just as simple, powerful and fun: *Macworld*. Now 12 issues of this attractive, easy-to-read publication can be yours for only \$24 (you save \$6).
- HOT CoCo.** Keep the color in your life all year long with *HOT CoCo*, the magazine specifically created for the TRS-80 color computer and MC-10 user. \$24.97 for 12 months. Save 30% off the cover price.
- 80Micro.** Don't risk being an uninformed TRS-80 user. Get current, unbiased, system-specific information from the largest, most knowledgeable TRS-80 source. \$24.97 for 12. Save 48% off the cover price.
- RUN.** The informative (and fun) Commodore 64/Vic-20 monthly. Comprehensive software/hardware reviews, action-packed games and timely tips to help you get the most out of your system. \$19.97 for one year: 43% off the cover price.
- Micro Marketworld.** Selling? Twice a month, get in-depth reviews/forecasts to keep **ahead** of consumer trends/market needs. FREE if you qualify.

On Communications. Bypass, teleconferencing, CATV: each month, explore the major developments shaping our communications world. FREE to qualified applicants.

TO ORDER:

Check the publications you want above, then fill in below, and return this page to:

CW Communications/Inc.
Circulation Department
Box 880
Framingham, MA 01701

Name _____ (Please print or type.)

Title _____

Company _____

Nature of Business _____

Street _____

City _____

State _____ Zip _____

Telephone () _____

Address shown is: Home Business

Bill me.

Payment enclosed (make check payable to "CW Communications/Inc.").

Send information about foreign rates.

Please allow 6-to-8 weeks for your first issue.

Your Money-Back Guarantee

If for any reason you're ever dissatisfied with your subscription, simply request a refund for all unmailed issues.



CW COMMUNICATIONS/INC.

375 Cochituate Road, Box 880
Framingham, MA 01701
(617) 879-0700

6CO9-12-EM05

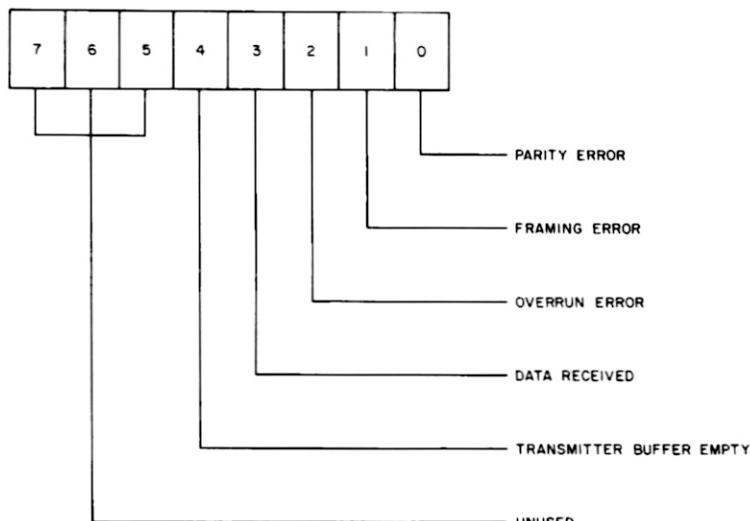


Figure 8. 6402 status register format.

number of iterations (not greater than FFFF hex).

The S (Substitute Memory) command lets you see memory locations in sequence beginning at a specified address, as well as selectively altered.

Conclusion

There is much more to be said about the DR800 board, but it is impractical to cover everything here. Interested readers are urged to use the list of references for further information. I will

C	Communicate with host system
D	Display memory
F	Fill memory with bit pattern
G	Go execute program
I	Input from port
L	Load program from host
M	Move memory block
O	Output to port
P	Put ASCII values in memory
R	RAM test
S	Substitute memory locations
X	Examine CPU registers

Table 2. DR800 monitor command summary.

also make copies of the DR800 manual available for \$5.

I would like to thank Don Szeles of Dexter Research enter, Dexter, MI, for his help in getting the material together for this project. ■

Write to Roger C. Alford at Washenaw Digital Systems, P.O. Box 2014, Ann Arbor, MI 48106. Please include a self-addressed, stamped envelope for a reply.

Circle 285 on Reader Service card.

UNINTERRUPTIBLE POWER SYSTEMS BY SUN RESEARCH

For complete protection from **Blackout, Brownout, Surge and Spike** specify a **MAYDAY** Uninterruptible Power System by **SUN RESEARCH**.

Eliminate costly downtime and lost data caused by those momentary power losses. Protect your software and hardware from damage caused by sudden drops in line voltage. Isolate your computer system completely from the AC wall circuit with a **MAYDAY** continuous (On-Line) Uninterruptible Power System. Give all your components clean 60Hz sine wave power for efficient operation at a price you can afford.

MAYDAY™ UNINTERRUPTIBLE POWER SYSTEMS BY SUN RESEARCH

Available in 150, 300, 600, 1000 and 1500 VA Capacities.

Call 1-603-859-7110



MAYDAY™ Division
SUN RESEARCH, INC.
Old Bay Road
Box 210
New Durham, N.H. 03855



Circle 383 on Reader Service card.

Pascal-80

As Reviewed in

80 Micro 12/82 80 US 2/83
Electronic Learning 6/83

Standard Pascal with many special features including random files up to 16 megabytes, peek, poke, and call, accessible pointer variables (like C), include, chain, and rename, graphics. Call or write for FREE descriptive brochure.

Pascal 80 \$79+ \$2 shipping
Pascal 80 School Package \$279
Pascal 80 Trial Version \$14.77
Graphics Package \$39.95

• NOW on CP/M!

Requires CP/M 80, 8"SSD, Epson, Kaypro, Apple CP/M, Morrow formats available. Call for information on other formats. \$39.95

NEW CLASSICS SOFTWARE

239 Fox Hill Road
Denville, NJ 07834
201-625-8838



Circle 282 on Reader Service card.

LETTER - WRITER™
"Integrated WORD PROCESSING Power"

SAVE 25% Price rise next month.
BUY NOW!

THE "BEST" SOFTWARE IS GUARANTEED! TRY IT and LIKE IT, or GET a REFUND

The machine code disk L-W is "A" rated by Allenbach's "SOFTWARE REPORTS" for:

- EASY USE, DOCUMENTATION, FEATURES
- FORM LETTERS and LABELS on any printer.
- ADD and SUB bookkeeping and tax columns.
- LEGAL PAPER LINE NUMBERING, Centering.
- Copy, move, delete, insert, merge, select.
- Screen display same as printout, unmodified MI users can see and print up/lower case.
- MASS MAILER, graphics, cancel changes.
- SPLIT SCREEN typing line, see old and new versions, word wrap, disk warm start.
- Over 50 "one key" INSERTION PHRASES.
- ONE MODE: Type / Edit / Delete without switching modes — NO TRAINING PERIOD.

WE PAY TAX and USA SHIPPING. Try your L-W for 3 months. Like it or return it for a refund, less our shipping costs of: \$3.50.

Models I, III / IV:	TAPE 16K \$ 33.99
DISK 32K (* Extra Features)	\$ 37.99
10 Verbatim SS/DD	\$ 19.99, DS/DD \$ 23.99
20 Microsette C-10 tapes and boxes	\$ 13.95

ASTRO-STAR ENTERPRISES
5905 Stone Hill Dr. Information/orders:
Rocklin, CA 95677 (916) 624-3709
Orders: 1-800-622-4070 in IL 1-800-942-7317

Circle 235 on Reader Service card.

For Model III & Model 4, 1 or 2 drives

FASTER READING Plus Better Comprehension with **SUCCESS** THE PERSONAL IMPROVEMENT PROGRAM

■ IN SCHOOL ■ AT WORK ■ AT HOME

Automatically adjusts to YOUR progress from present speed to Speed Reading
THE "SUCCESS" SYSTEM WON'T LET YOU FAIL
DOUBLES reading speed in three weeks!

Includes two discs, manual, 15 lessons develop vocabulary, visual skills, reading speed and comprehension. Stores response. Charts progress. (No computer knowledge needed)

Two great series - more coming.
Series 1 - General reading. Fifteen original stories; history, sports, mystery, culture.
Series 2 - Investments. Learn how to invest money while improving your reading skills.

ORDER NOW
Introductory 30% discount — only \$49.50
Additional lesson discs — \$19.95

LSR Learning Associates, Inc.
707 Broad Hollow Road
Farmingdale, New York 11735
(516) 293-6699



ALWAYS AT SALE PRICES



HARD DISK DRIVES

TANDY® COMPUTERS

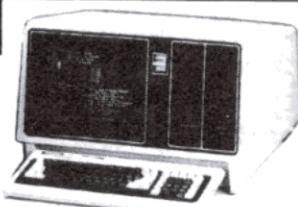
WITH THE MANUFACTURERS WARRANTY



CUSTOMER SERVICE
(817) 481-5433
(9 a.m. - 5 p.m. C.S.T.)

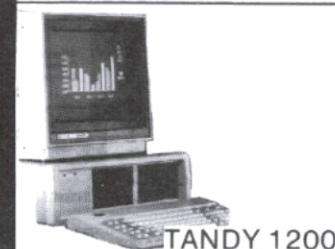
DFW COMPUTER CENTER
326-MAIN ST.,
GRAPEVINE, TEXAS 76051

CHECK OUR SALE PRICES



MODEL 12

HAVE YOU GOT OUR PRICES?
CALL TOLL FREE
1-800-433-SALE



TANDY 1200



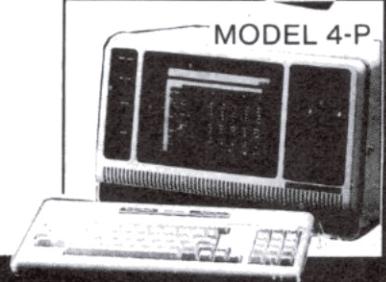
TANDY 6000



TANDY 1000



TANDY 200



MODEL 4-P

\$777

NEW!



Comes complete with cable
and choice of software driver*
(CPM, LDOS, TRSDOS)

10 Megabyte Hard Drive	\$899
15 Megabyte Hard Drive	1095
30 Megabyte Hard Drive	1495

SYSTEM FEATURES

- For TRS-80 Model 3-4-4P
- One Year Parts & Labor Warranty
- Size Rated After Format
- Continuous Duty Power Supply
- Error Checking & Correcting
- Continuous Duty Fan
- Size 11.5" x 12.5" x 5.0"
- All Contacts Gold Plated

*Model 3 requires LDOS

Model 4 requires TRSDOS 6.2 or Montezuma Micro CPM 2.2

MODEL I DOUBLE DENSITY BOARD

Add 80% more capacity to your disk system with the Double Density Controller (DDC) from Aerocomp.

The Story

Some products have what it takes to seem to last forever. Our "DDC" is one of those products. What it does is allow you to operate your TRS-80 Model 1 disk system in double density. In this case double density means almost doubling the storage capacity of your diskettes. Single density, that's the way Radio Shack designed your Model 1 expansion interface, organizes your disk into 10 sectors per track. Each sector contains 256 bytes of data for a total storage capacity of 2,560 bytes or 2.5K per track times the number of tracks your drive is capable of addressing. Double density, on the other hand, writes 18 sectors per track each containing 256 bytes for a total of 4,608 bytes or 4.5K. That is 80% more data in the same space. Why didn't Radio Shack do that in the beginning, you ask? Well it costs money to do double density because it is more difficult to do than single density and the data is harder to capture reliably. That means more cost and the Model 1 was meant to be a low-cost computer for the masses. Therefore, no double density for the original Model 1.

The Facts

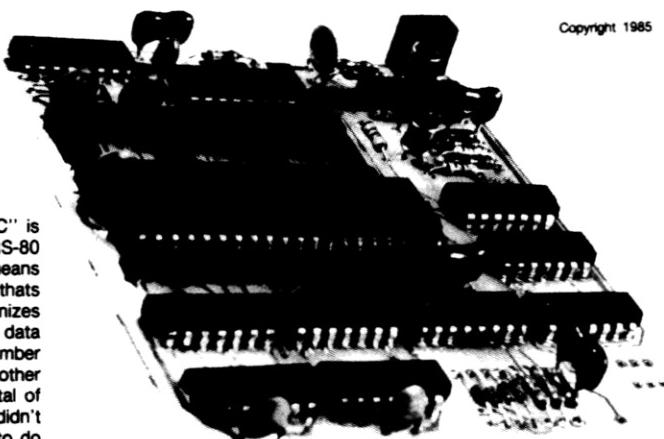
Other companies introduced double density controllers for the Model 1 but they were not so good. We waited and waited but, even new models failed to correct problems with data separation that kept cropping up. So we went to work and came up with a new design to cure the old problem. At last! A double density controller for the Model 1 with a higher probability of data recovery than with any other double density controller on the market then or since. Our analog design phase lock loop data separator has a wider capture window than the digital types the others use. This allows high resolution data centering. Our "DDC" analog circuit allows infinitely variable tuning. The attack and settling times are optimum for 5.25" diskettes. The oft-stated fears of adjustment problems rumored by digital dillitantes have been proved groundless by thousands of satisfied users the world over. The bottom line here is state-of-the-art performance and reliability.

5 MEG HARD DRIVE

There are firms which offer benefits, experience or products seemingly too good to be true. Now why would you want to expose yourself to unhappiness when Aerocomp has a proven record of thousands of happy, satisfied TRS-80 customers. Just take a minute to look through back issues of this magazine. You won't find many companies that have been around as long as Aerocomp. We fully support TRS-80 computers and most all operating systems including CP/M 2.2. Aerocomp leads the way to low hard disk prices so you can afford to enjoy the benefits of increased storage and faster disk I/O. These units are precision engineered, tested and delivered complete and ready to use, right from our stock. Each unit is guaranteed for one year parts and labor. You can count on us to be here if you should ever need us. As always, your satisfaction is assured with our 14 day free trial offer. If, for some reason, you are dissatisfied with our drive merely return it for a full refund (less shipping). How can you go wrong? Specify the software driver of your choice and start enjoying your computer's real capability. Do it today! Call our toll-free number now!

See opposite page ►►►►►►

Copyright 1985



ORDER YOURS TODAY

TRS-80 Model 1 disk system owners who are ready for reliable double density operation will get 80% more storage per diskette; single and double density data separation with far fewer disk I/O errors; single density compatibility; simple plug-in operation. You will need a disk operating system that has the necessary double density software. All the popular DOS's (except TRSDOS) have the drivers. We have put together two special packages in the event you don't already have one of the more popular DOS's.

Please add \$4 handling & shipping

"DDC" by itself	\$ 99
"DDC" and LDOS	159
"DDC" and NEWDOS 80 2.0	179

- 40 Track
- 80 Track
- Single Head
- Dual Head
- Bare
- Complete
- Full Size
- Half Size

DISK DRIVES

Aerocomp leads the way to the BEST value in disk drives and related peripheral products on the market today. Sound engineering, high performance, quality construction, no-risk free trial, outstanding warranty service and a reputation for doing the right thing make your decision to buy Aerocomp the correct one. Please look over our offerings and make your selection. When you have made your choice call our toll-free number and place your order. If you need assistance in making your selection, please call our information number. It's listed in the box at the bottom of this ad along with the technical assistance number for those of you who want to get right to the nitty-gritty. Thanks, we all appreciate your business and will continue to do our very best to support you.

BARE DRIVES Add \$4 S&H

These drives are completely burned-in and tested for your ultimate satisfaction. Add that extra drive today! These are new factory drives. No blem's, seconds or closeouts. Instruction manual included at no extra cost. Service manuals are available. See "Miscellaneous Goodies" for info.

40tk SS full size Tandon TM100-1	\$ 129
40tk DS full size Tandon TM100-2	169
40tk SS half high TEAC FD55-A.....	129
40tk DS half high TEAC FD55-B.....	169
80tk DS full size Tandon TM101-4	289
80tk DS half high TEAC FD55-F	239
8" SS Thinline Tandon TM848-1E.....	260
8" DS Thinline Tandon TM848-2E.....	335

8" FLOPPY DRIVES Add \$12 S&H

These 8" Thinline drives work with the Model 2 and 16 plus others that use standard drives. The rugged all-steel cabinet has an extra heavy duty power supply rated for continuous operation. A removable air filter allows only clean air to circulate. Cabinets with single drives are supplied with a blank panel to cover the unused space. A second drive can be added at any time. Service manuals are available. See "Miscellaneous Goodies" for info.

1-8" SS Tandon TM848-1E & case	\$ 389
2-8" SS Tandon TM848-1E's & case	649
1-8" DS Tandon TM848-1E & case	439
2-8" DS Tandon TM848-2E's & case	699

MISCELLANEOUS GOODIES \$2 S&H

Model 1 TRSDOS 2.3 disk & manual	\$ 25
Model 3 TRSDOS 1.3 disk & manual	25
Model 4 TRSDOS 6.2.x disk & manual	20
LDOS (specify Model I or III)	69
NEWDOS 80 v2.0 (specify Model I or III)	99
Montezuma Micro Model 4 CP/M 2.2	169
Tandon TM100-1/2 Service Manual	20
Tandon TM848-1/2 Service Manual	20
TEAC FD55A/B/F Service Manual	20
10 SSDD disks in library box, Lifetime Guar .16	
10 DSDD disks in library box, Lifetime Guar .19	
5.25" drive power supply & enclosure	59
8" drive pwr sply & encl w/fan 5V-24V	150
5.25" 1-drive cable, a nice length	19
5.25" 2-drive cable, a 44 incher	24
5.25" 3-drive cable, just the right size	29
5.25" 4-drive cable, the top dog	34
5.25" Extender cable with gold contacts	10

COMPLETE DRIVES Add \$6 S&H

Fits TRS-80 Models 1,3,4 and the Color Computer plus the others that use standard drives. The drive of your choice is mounted in a sturdy, all-steel cabinet. An external gold plated drive connector allows cabling without disassembly of the cabinet. Half-high drives come in a full-size cabinet that will hold and power our half-high drives. Single drives have a panel covering the unused space allowing a second drive to be added at any time. All are shipped fully assembled ready to use. Specify silver or white enclosure.

40tk Single Side full size (TM100-1).....	\$ 169
40tk Double Side full size (TM100-2).....	199
80tk DS full size (TM101-4).....	299
1-40tk SS half-high FD-55A in dual case	169
2-40tk SS half-high FD-55A's in dual case	319
1-40tk DS half-high FD-55B in dual case	199
2-40tk DS half-high FD-55B's in dual case	359
1-80tk DS half-high FD-55F in dual case	219
2-80tk DS half-high FD-55F's in dual case	389

FREE TRIAL OFFER

Use your Aerocomp hardware product for up to 14 days. If you are not satisfied for ANY REASON (except misuse, damage or improper handling), return it (insured) in the original shipping container for a full purchase price refund, less shipping. Sorry, this offer does not apply to software. Defective software will be replaced. Any hardware/software specials will be prorated and the software will be charged at the regular unbundled price. We have confidence in our products and we know you will be satisfied.

WARRANTY

We offer a one year warranty on parts and labor against defects in materials and workmanship. In the event service becomes necessary for any reason you will find our service department fast, friendly and cooperative. We want to keep you happy. Out of warranty repairs are also available.

100% BURN-IN and TEST

All our products are burned-in and fully tested prior to shipment. We want you to receive an item ready-to-go. AEROCOMP means reliability!

ORDER NOW!

Call our toll-free number service and place your order. Have your American Express, Mastercharge or Visa number ready. We will not charge your card until the day we ship your order. You may order by mail using your credit card, check or money order. Personal and company checks are welcome and cause no shipping delay as long as they are bank printed and the signature exactly agrees with the name printed on the check. We will ship surface COD with no deposit but all COD's require cash or a cashier's check on delivery. Texas residents add 6% State Sales Tax. No tax collected on out of state shipments. Canadian addresses add \$20 to your order if over \$550 for customs documentation.

TRS-80 Model III & 4 DISK CONTROLLER and DRIVE KITS

Convert your cassette Model III or 4 to disk operation with one of our complete kits. You receive our own advanced disk controller board with gold plated edge contacts capable of 4-drive operation; our own power supply; plated steel mounting towers complete with RFI shield plus all the cables and hardware necessary. Detailed instructions are included. All you need is a screwdriver and a pair of pliers. System kits come with 40 track single-side drives or just order the basic kit and pick the drives you want from the selection in the next column.

CONTROLLER KIT	\$ 199
(Everything you need - less drives/DOS)	
1 DRIVE SYSTEM.....	319
2 DRIVE SYSTEM.....	439
Add \$8 S&H	
MOUNTING KIT &	
POWER SUPPLY.....	95
Add \$8 S&H	
CONTROLLER BRD. ONLY ..	110
RS-232 BOARD & KIT	69
Add \$4 S&H	

OUR FAMOUS MODEL I STARTER PACKAGE

If you have a Model I and an Expansion Interface this is what you need to get started with disks. Included is one 40 track single-side disk drive complete with matching silver case and power supply, a 2-drive cable, a TRSDOS 2.3 disk operating system and TRSDOS manual plus all insurance and delivery charges to your door (lower 48 states).

Yours for only **\$ 199**

You can add our renown "DDC" double density controller to either the Radio Shack or the LNW Expansion Interface for 80% more storage capacity on your drive. Order it at the same time as our starter package above and we'll pay the shipping. Go ahead, you deserve increased density. See the opposite page for the latest technical details.

\$ 99

CALL TOLL-FREE
800-527-3582 USA
800-442-1310 TEXAS

For inquiries or information
or to check on or change an order
call 214-339-8324

AEROCOMP
Redbird Airport, Bldg. 8
P.O. Box 24829
Dallas, TX 75224

Log Off at 05:85

Connect Time: 13 Months

Installing and maintaining your own bulletin board system (BBS) isn't difficult, but it does require close attention to detail. Your attention should focus primarily on a telephone, a modem, a universal asynchronous receiver/transmitter (UART) a computer, and the BBS software. While each element has a unique function, smooth and efficient interaction among the components is of paramount importance.

Consider some potential trouble spots on the BBS. A poor telephone connection is the first thing to check if you're having problems. The telephone has to deliver a clear signal at all times; any static on the line will cause problems.

If the telephone is doing its job and you're still having problems, check out the modem. Simply put, there are good modems and bad modems; Radio Shack's Modem II falls into the second category. Though some people have been able to use the Modem II successfully, we've yet to find reliable solutions to the hang-up and reset problems characteristic of this modem. You can turn the modem off and then back on to initiate a reset, but this just isn't practical on a BBS. Try these commands if you own a Modem II.

```
OUT234,175:FOR X = 1 TO 1000:NEXT:  
OUT 234,164
```

or

```
OUT234,180:FOR X = 1 TO 1000:NEXT:  
OUT 234,164
```

If you're using the Hayes Smart-modem, set the front panel switches to UDUDUUU.

Some modems in half-duplex systems, like the Hayes, have a habit of echoing everything back to the computer. If the software echoes everything it receives to the modem and the modem echoes everything it receives to the software, you're stuck with an infinite loop. The cursor zips to the end of a 255-byte line and locks up your



system. If this happens, turn off your modem's echo function.

Automatic Control

When you turn on your Model III, there's no connection between the communications line and the video or keyboard. This is the responsibility of Upload, the BBS's software linker. From TRSDOS Ready, type in UPLOAD. The TRSDOS Ready banner should return, though it'll run slowly. If, however, your cursor goes crazy, your modem is echoing.

Under LDOS, the procedure is a little different. You'll need this JCL file (LINKUP):

```
MEMORY (HIGH = X'FDFF')  
UPLOAD  
SET *KI KI (TYPE)  
SET *CL RS232T (DTR = ON)  
(RS232R on the Model I)  
LINK *KI *CL  
LBASIC RUN "HOST/BAS"  
//STOP
```

To run your BBS from LDOS, type in DO = LINKUP. LDOS is more convenient than TRSDOS here because you can apply an automatic boot-up command to the disk by typing in AUTO DO = LINKUP.

TRSDOS can't handle an automatic command because of memory conflicts. Instead, get into Basic, set the memory size at 65000, reserve three files, and type in RUN "HOST/BAS". Before entering Basic, however, you need to build a file. To do this, type in BUILD MSG0001/BBS:1 at the Ready prompt of either DOS. When the disk drive light goes out, type in the following: "Hi, everybody. Welcome to my BBS." Then press the enter key, followed by the break key.

Signing On

One of your first tasks after booting up the BBS is to log yourself on as the sysop. There's only one way to do this and that's from the console. Operating from the console is called the wizard mode. It gives you full access to

System Requirements

Model III



48K RAM

Disk Basic

Assembly language

Two disk drives

Editor/assembler

BBS EXPRESS

Program Listing 1. BBS machine-language assist module.

```

00050 ;Towne Crier machine code receive and assist module
00060 ;Copyright (c) 1984 Schneider and Bowen
00070 ;All rights reserved. For 80-Micro Subscribers only
00080 ;No transfer, duplication or distribution rights
00090 ;granted.

00110 ; RECEIVER SECTION 3/23/84
00120 ; RECEIVES CHARACTERS FROM THE RS232 LINK
00130 ; OR THE KEYBOARD, AND STORES THEM
00140 ; SEQUENTIALLY IN IS UNTIL THE LENGTH OF IS
00150 ; IS MET, OR A CARRAIGE RETURN IS ENTERED.
00160 ; RECOGNIZES BACKSPACE, AND RETURNS ERROR
CONDITION
00170 ; ON LOSS OF USER CARRIER.
00180 ;
00190 ;
00200 VBLK EQU 401DH ;VIDEO DCB
00210 KBLK EQU 4015H ;KB DCB
00220 UDATA EQU 0EBH ;UART DATA PORT
00230 USTAT EQU 0EAH ;UART STATUS REGISTER
00240 MSTAT EQU 0E2H ;MODEM STATUS PORT
00250 PRINT EQU 33H ;ROM PRINT ROUTINE
00260 KEYBRD EQU 2BH ;ROM KEYBOARD SCAN
00270 BASIC EQU 0A9AH ;PASS TO BASIC
00280 TODOS EQU 402DH ;JUMP TO DOS
00290 TRSDOS EQU 1 ;SET TO 0 FOR LDOS

00300 ;
00310 ;
00320 ORG 0FE00H
00330 RECV CALL PARAM ;GET STRING VALUES
00340 MN LD B,245
00350 LD C,0 ;ACCUMULATOR
00360 LD A,11H ;CONTROL-Q
00370 CALL PRINT ;SEND IT
00380 MAIN IN A,(MSTAT) ;CHECK MODEM STATUS
00390 AND 32 ;CHECK CARRIER DETECT
00400 TN JR NZ,NOTONE ;LOST THE TONE
00410 CALL KEYBRD ;CHECK EVERYTHING
ELSE
00420 OR A
00430 JR Z,MAIN ;NOTHING
00440 CP 8 ;BKSPCE?
00450 JR NZ,NOTBKS ;NO
00460 LD A,C
00470 OR A ;AT FIRST CHAR?
00480 JR Z,MAIN ;YES - IGNORE
00490 INC B
00500 INC B ;FOR THE DECREMENT
00510 DEC C
00520 DEC C ;FOR THE INCREMENT
00530 DEC HL
00540 LD (HL),20H
00550 DEC HL
00560 LD A,8
00570 JR NP ;PERFORM BKSPCE
00580 NOTBKS LD (HL),A ;STORE CHARACTER
00590 NP CALL PRINT ;PRINT IT
00600 INC HL ;FOR NEXT CHARACTER
00610 INC C
00620 CP 0DH ;TERMINATOR ENTERED?
00630 JR Z,EXIT ;TERMINATOR FOUND
00640 NOTBKS DJNZ MAIN ;LOOP TIL DONE
00650 EXIT LD A,13H ;CONTROL-S
00660 CALL PRINT ;SEND IT
00670 LD B,255 ;DELAY
00680 LD E,10 ;MAX # OF CHAR
00690 EXI010 IN A,(MSTAT) ;CHECK MODEM STATUS
00700 AND 32 ;CARRIER DETECT
00710 TT JR NZ,NOTONE ;LOST CARRIER
00720 CALL KEYBRD ;CHECK FOR INCOMING
00730 OR A
00740 JR Z,EXI030 ;NONE - EXIT
00750 INC C ;COUNT CHARACTER
00760 LD (HL),A ;STORE IT
00770 INC HL ;BUMP POINTER
00780 DEC E ;DECREMENT CHAR.
COUNT
00800 JR Z,EXI020 ;MAX # RECEIVED
00810 EXI030 DJNZ EXI010 ;DECREMENT TIMER
00820 EXI020 LD L,C
00830 LD H,0 ;TO PASS TO BASIC
00840 JP BASIC
00850 NOTONE LD HL,-1
00860 JP BASIC ;PASS ERROR TO BASIC
00870 ;
00880 ;
00890 ; CAPITALIZATION ROUTINE
00900 ; CAPITALIZES CHARACTERS IN THE RANGE
00910 ; 96 < C < 123
00920 ;
00930 ORG 0FE6CH
00940 CAPIT CALL PARAM ;GET VARPTR(I9)
00950 CAPL LD A,(HL)
00960 CP 97
00970 JR C,NOCAP ;C<97
00980 CP 123
00990 JR NC,NOCAP ;C>122
01000 AND 95 ;MAKE IT A CAPITAL
01010 LD (HL),A ;REPLACE IT
01020 NOCAP INC HL
01030 DJNZ CAPL
01040 RET ;DONE
01050 ;

01060 ; VIDEO SCANNER
01070 ; RECEIVES STRING VARPTR AND VIDEO WIDTH
01080 ; FROM BASIC, AND PARSES STRING TO CORRECT
01090 ; WIDTH
01100 ;
01110 PARSE CALL PARAM ;GET VARPTR(STRING)
01120 LD A,(REMAIN)
01130 LD C,A ;REMAIN. CHAR. TO C
01140 LD DE,0 ;CLEAR COUNTER
01150 LD (SPACE),DE ;CLEAR SPACE
INDICATOR
01160 SLOOP LD A,(HL) ;GET CHAR.
01170 CP 20H ;SPACE?
01180 JR NZ,SL010 ;NO
01190 LD (SPACE),HL
01200 LD E,B ;SAVE COUNTER &
ADDRESS
01210 SL010 CP 0DH ;CAR. RET?
01220 JR NZ,SL020 ;NOPE
01230 LD DE,0
01240 LD (SPACE),DE ;CLEAR THINGS OUT
01250 LD A,(VIDWIT)
01260 LD C,A
01270 JR ELOOP
01280 SL020 DEC C
01290 JR NZ,ELOOP ;HAVEN'T REACHED END
01300 LD A,(VIDWIT)
01310 LD C,A ;RESET VIDWIDTH
01320 LD A,E
01330 OR A ;SPACE IN LINE?
01340 JR Z,ELOOP ;NOPE
01350 LD HL,(SPACE)
01360 LD (HL),0DH ;INSERT C.R.
01370 LD B,E ;RESET COUNTER
01380 LD DE,0
01390 LD (SPACE),DE ;RESET MARKER
01400 ELOOP INC HL ;FOR NEXT CHAR.
01410 DJNZ SLOOP ;LOOP TIL DONE
01420 LD A,C
01430 LD (REMAIN),A ;STORE REMAINING
01440 LD A,E
01450 OR A ;SPACE IN LAST LINE?
01460 RET Z ;NOPE
01470 LD A,C
01480 CP 5 ;REMAINING CHAR <=5?
01490 RET NC ;NOPE
01500 LD A,(VIDWIT)
01510 ADD A,E ;A=VIDWIT+SPACE
COUNTER
01520 SUB (IX+0) ;A=VIDWIT+SPACE-LEN(STR)
01530 LD (REMAIN),A ;RESET REMAINING
CHAR.
01540 LD HL,(SPACE)
01550 LD (HL),0DH ;INSERT C.R.
01560 RET
01570 REMAIN DEFB 0
01580 SPACE DEFW 00
01590 VIDWIT DEFB 0
01600 ;
01610 ; PARAMETER RECOVERY SUBROUTINE
01620 ; RECOVERS VARPTR(STRING) AND PLACES
01630 ; LENGTH IN B, STRING ADDRESS IN HL
01640 ; VARPTR(STRING) IN IX
01650 ;
01660 PARAM CALL 0A7FH ;GET VARPTR(STRING)
01670 PUSH HL
01680 POP IX ;TO IX
01690 LD B,(IX+0) ;LENGTH TO B
01700 LD L,(IX+1)
01710 LD H,(IX+2) ;ADDRESS TO HL
01720 RET ;DONE
01730 ;
01740 ; SEARCH FORWARD FOR SPECIFIED 2-BYTE STRING
01750 ;
01760 FSRCH CALL PARAM ;GET VARPTR(MNS)
01770 SEARCH LD DE,0000 ;SEARCH STRING
01780 PUSH HL
01790 POP IX
01800 LD C,255 ;STR. POS. COUNTER
01810 FSR010 LD L,(IX+0)
01820 LD H,(IX+1) ;GET FIRST PAIR FOR
CMPR
01830 INC C
01840 INC C ;BUMP STRNG POINTER
01850 BIT 7,H ;CHECK FOR NEGATIVE
01860 JR NZ,REVR ;NEGATIVE - DEAD FILE
01870 RST 18H ;COMPARE HL/DE
01880 JR Z,FSR100 ;FOUND
01890 JR NC,FSR100 ;TARGET>SOURCE
01900 REVR INC IX
01910 INC IX
01920 DEC B
01930 DJNZ FSR010 ;LOOP TIL FOUND
01940 FSR100 INC C ;STRPOS+1
01950 SRL C ;(STRPOS+1)/2
01960 LD B,0
01970 PUSH BC
01980 POP HL
01990 JP BASIC ;PASS TO BASIC
02000 ;

```

Listing continued

Listing continued

```

02010 ; NEW VIDEO DRIVER PATCH
02020 ;
02030 VIDEO PUSH AF      ;SAVE FLAGS
02040 PUSH BC      ;SAVE CHARACTER
02050 VWAIT IN A,(USTAT) ;CHECK UART FOR CLEAR
02060 AND 40H      ;BIT 6 IS THE ONE
02070 JR Z,VWAIT   ;TRANSMITTER BUSY
02080 LD A,C      ;GET CHARACTER
02090 OUT (UDATA),A ;SEND IT
02100 PF AND 255    ;LF/CR SWITCH
02110 CP 0DH      ;CAR. RET?
02120 JR NZ,VID010
02130 LD C,0AH      ;INSERT L.F.
02140 JR VWAIT    ;SEND L.F.
02150 VID010 POP BC      ;RECOVER CHARACTER
02160 POP AF      ;RECOVER FLAGS
02170 VCONT JP 0000    ;PATCH POINT
02180 ;
02190 ; NEW KEYBOARD DRIVER PATCH
02200 ;
02210 KEYBD PUSH BC      ;SAVE FLAGS
02220 PUSH AF      ;SAVE FLAGS
02230 IN A,(USTAT) ;CHECK UART
02240 AND 80H      ;CHECK BIT 7 - DATA
REC'D
02250 JR Z,KOUT    ;NONE READY
02260 IN A,(UDATA) ;GET DATA
02270 CP 1          ;CHECK FOR BREAK
02280 JR Z,KOUT    ;AND IGNORE
02290 LD C,A      ;RECOVER FLAGS
02300 POP AF      ;CHAR. TO A
02310 LD A,C      ;CHAR. TO A
02320 POP BC      ;CHAR. TO A
02330 RET
02340 KOUT POP AF
02350 POP BC
02360 KCONT JP 0000    ;PATCH POINT
02370 ;
02380 ; INSTALLATION OF NEW VIDEO AND KEYBOARD
02390 ; LINKS TO RS-232
02400 ;
02410 ; FIRST, PATCH VIDEO DCB TO NEW ROUTINE
02420 ;
02430 INSTAL DI      ;A LITTLE PRIVACY,
PLEASE
02440 LD DE,(VBLK+1) ;GET EXISTING ADDRESS

```

everything in the system. Only a wizard or a sysop can change access codes.

Because you don't have a System/BBS data file yet, the BBS has no system defaults or system password. This prevents even a wizard from entering the system, so you'll have to use the break key to get into the BBS this first time. When the system asks for a system password, hit the break key, then type in GOTO 1600 to bypass the log-on procedures.

A Note About Passwords

If you set your system password to **PASSWORD**, your board becomes an auto sign-on board, meaning that anyone can become a member simply by calling the board. If the system password is something other than **PASSWORD**, a new caller must know the password before signing on. Under these circumstances, the board is referred to as a closed-access board.

On the first run, the system password could be anything, depending on what was on the disk before you started. You'll be prompted for your name, address, and other personal information. Set your password to something other than **PASSWORD**—you're the sysop and you must protect your

personal BBS records. Set your access level to **0123456789ABCDE***. The asterisk gives you sysop powers.

Next, from the Main Command prompt, enter a dollar sign. This is your point of entry into sysopland and works only if you include an asterisk in your access code. From the Sysop's Access mode, choose S for system, and set your defaults by choosing each of the displayed items by number.

Unless you're running a closed board, we suggest that you set line feeds to Y, video width to 64, and the system password to **PASSWORD**. The default access is the access level to which the BBS assigns new callers. You can enter digits 0-9 and letters A-E, though you don't have to keep them in order. For example, **03E** is acceptable. For starters, set the board's maximum number of messages to 50 to prevent running out of directory slots.

Now choose N from the sysop command menu and name each of the BBS's 15 special-interest sections. Name the sections with care as callers often read special-interest letters only. Use the B command to write a bulletin board message for the new callers, welcoming them to your board. Now you're ready for business.

```

02450 LD HL,VIDEO ;NEW ADDRESS
02460 LD (VBLK+1),HL ;PUT NEW ADDRESS IN
DCB
02470 LD (VCONT+1),DE ;PUT OLD ADDRESS IN
VIDEO
02480 COND TRSDOS ;ASSEMBLE IF TRSDOS
02490 ;
02500 ; THEN, PATCH KEYBOARD DCB
02510 ; TRSDOS 1.3 ONLY
02520 ;
02530 LD DE,(KBLK+1) ;GET OLD ADDRESS
02540 LD HL,KEYBD ;NEW ADDRESS
02550 LD (KBLK+1),HL ;INSTALL NEW ADDRESS
02560 LD (KCONT+1),DE ;OLD ONE TO OUR
ROUTINE
02570 ;
02580 ; FINALLY, CONFIGURE UART FOR 300/7/E/1
02590 ; TRSDOS 1.3 ONLY
02600 ;
02610 OUT (0E8H),A ;MASTER RESET
02620 LD A,55H ;SET 300 BAUD
SEND/RECV
02630 OUT (0E9H),A
02640 LD A,0A4H ;7/E/1
02650 OUT (0EAH),A ;SET IT
02660 ENDC
02670 IN010 EI
02680 JP TODOS
02690 END INSTAL

```

End

Program Listing 2. Remaining Basic lines needed to complete the BBS Express.

```

1360 IF (INP(&HE8)AND32)=0 THEN 1380
1365 AS=INKEYS:N=PEEK(6H387F):IFN=0THEN1360
1375 IF AS<>"THEN AS=CHR$(ASC(AS)AND95):GOTO6500 ELSE1360
3305 IF (TTS="ALL") AND (SY) THEN TTS=TTS+CHR$(128)
3610 LSET F1$=NAS:LSET T2$=TIMES:LSET F2$=AS:LSET
T1$=TTS:LSET S1$=S8$:LSET S2$=CHR$(ASC(S7$) AND 32) OR
(ASC(S9$)):PUT 1,SN:PRINT"Awaiting delivery.":GOTO3640
3640 POKE MN,250:RETURN

```

End

The message board might cause some problems at first because it requires at least one message to function properly. Hence, you need to set the message index (MB\$). To do this, type in a dollar sign (\$) at the sysop command to break the program. Now, in the immediate mode, enter **MB\$=MKI\$(1)+STRING\$(98,CHR\$(0))**. This indexes the very first message, though you still need a header. To get one, type in the following:

```

GOSUB 220:GET 1,1:LSET T1$="ALL"
:LSET F1$="SYSOP":LSET F2$="MSG
001":LSET S2$=CHR$(1):LSET S1$=
"WELCOME":LSET T2$=TIMES:PUT1,
1:CLOSE.

```

Next, you need to set up the System/BBS file. The command for this is:

```

SH = 1:SN = 1:SL = 1:GOSUB190:GET
3,1:LSET SNS$ = MKI$(SN):LSET SLS =
MKI$(SL):LSET SH$ = MKI$(SH):LSET
SC$ = MKI$(1):LSET NMS$ = MKI$(1):LSET
DSS$ = MKI$(0):LSET NDS$ = MKI$(0):PUT3,
1:CLOSE.

```

Reenter the program now by typing in **CONT**. We have one message and one header indexed, so write a message and log off with the **E** command. Never exit without first logging off with this **E** command.

BBS EXPRESS

An easier way to handle the initial business of setting up your board is to call us at 606-739-6088 and pick up a copy of INTRO/BAS from our data base—it does all the above for you.

Closing Thoughts

Program Listing 1 is the machine-language assist module; Program Listing 2 provides a few lines we missed in previous listings. You should have no problems incorporating these listings with those from other BBS Express installments.

The COND and ENDC statements in Listing 1 are conditionals. If your assembler doesn't support this syntax, delete the lines marked for TRSDOS to make an LDOS version.

Originally, we thought that the BBS Express was relatively crash proof. In November, however, we received reports of repeated crashes and realized that the vandals were waiting out the modem and gaining access to the title page options. Lines 2705 and 1335 of Listing 2 prevent this from happening.

TRSDOS seems to be more of a problem than we originally anticipated, particularly with regard to the sysop Submit command. One version handles variable length records poorly, while the other doesn't handle them at all. In addition, TRSDOS allows only 80 files on a data disk, and if the total exceeds 80, TRSDOS reports that the disk is full. If you have a high-traffic operation in mind, drop us a line and we'll fix you up with a high-volume version of the BBS Express. LDOS users, on the other hand, report no problems. In fact, if you switch to LDOS, you get 112 files, a 40 percent increase in board capacity.

We've had a lot of fun with the BBS Express and hope it has been a rewarding experience for all of you who've been following us for the past year. ■

This installment marks the end of the BBS Express, 80 Micro's do-it-yourself bulletin board. To see the finished product, call the 80 Micro BBS at 603-924-6985. UART parameters are 300 baud, 7-bit words, 1 stop bit, and even parity.

You can reach J. Stewart Schneider and Charles E. Bowen either through their bulletin board at 606-739-6088 or c/o Saturday Software, P.O. Box 404, Catlettsburg, KY 41129.

Circle 290 on Reader Service card.

Buy the Best CP/M[®] for Tandy computers.

Pickles & Trout CP/M is the product of over four years of experience with Radio Shack computers — and their users.

Thousands of people use it with pleasure. So can you.

IT'S FLEXIBLE

With P&T CP/M 2, you can take advantage of every feature of your Mod II/12/16. Choose from among the 2000 or more CP/M-80 programs now on the market. Use either Radio Shack or Corvus hard disk systems. And use Radio Shack or non-Radio Shack printers, plotters, modems, terminals and other peripherals.

IT'S WELL-SUPPORTED

The fully-indexed P&T manual is understandable and comprehensive. And our experienced support staff is always available to help you.

IT'S COMPACT AND POWERFUL

P&T CP/M 2 packs a lot of power into as little as 8.5 Kbytes of RAM. Its many unique features include a master diskette that automatically copies itself, an easily-used system MENU, 20 special utilities, programmable keys, a full-screen editor, a screen print function, and many extra programming tools.

IT'S A BARGAIN

The floppy disk version of P&T CP/M 2 is only \$200. Hard disk versions are \$250. And no hardware modifications are required.

Order today or use the attached coupon to find out more about the best CP/M for your Mod II/12/16.

Name _____

Address _____

City _____ State _____ Zip _____

Phone _____

or send us your business card.



Pickles & Trout[®]

P.O. Box 1206, Goleta, California 93116

(805) 685-4641

'80

TRS-80[®] Radio Shack/Tandy Corporation; CP/M[®] Digital Research;
Pickles & Trout[®] Pickles & Trout © 1984 Pickles & Trout

Like a Circle in a Circle, Like a String Within a String

The Basic INSTR statement is short for "instr." It provides a quick way to check for characters within a character string. For example, if you type in PRINT INSTR ("hambone", "bone") and press the enter key, the computer displays a 4. This tells you that the character string "bone" appears in the string "hambone" starting at the fourth character.

Uses for INSTR are as diverse as your imagination. I've used it to direct program execution, validate responses to program prompts, separate data items into specified categories, and selectively print out or display data. Model I Basic doesn't recognize INSTR, but you can use it in Models III and 4 Basic and in GW-Basic.

Starting with INSTR

INSTR statements take the form INSTR(search string, sought string). Basic checks for the occurrence of the sought string within the search string.

You can search for string literals, as in the hambone example above; for string variables, such as INSTR(A\$, Z\$); or for a combination of string variables and literals, such as INSTR ("Peace", B1\$) or INSTR(LIST\$, "Enid").

Learning by Example

Type in PRINT INSTR("hambon", "bone") and hit the enter key. The answer is zero because the string "bone" does not occur within "hambon."

Now type in PRINT INSTR(6, "hambone", "bone"). The computer again responds with a zero, even though "bone" resides within "hambone." The number six, the first item in the parentheses, tells Basic to start searching at the sixth character in "hambone." Basic reads the letters "ne" and returns a zero answer. Basic will also return a zero if the position number is greater than the length of the search string.

Now that you know INSTR funda-



Program Listing 1. Search String.

```

100 REM * Search String *
110 REM * Won't work on Model I *
120 CLS: A$="The quick brown fox"
130 PRINT "THE SEARCH STRING: "A$
140 INPUT "Type a sought string ";B$
150 CLS: Z=INSTR(A$,B$)
160 PRINT "The character(s): ";B$
170 IF Z=0 THEN PRINT " do not occur in "A$:END
180 REM * If program reaches this line, the Z > 0.
190 PRINT "appear in "; PRINT A$
200 PRINT STRINGS(Z-1,32);STRINGS(LEN(B$),"-")
210 PRINT "starting at character position"Z
220 END

```

End

Program Listing 2. Input Menu.

```

100 REM * INPUT MENU - Without INSTR *
110 REM * Works on all TRS-80s *
120 CLS: PRINT "The Menu:"
130 PRINT "1 - First"
140 PRINT "2 - Second"
150 PRINT "3 - Third"
160 PRINT:PRINT "Press 1, 2 or 3 for choice and press enter."
170 INPUT Z
180 CLS: Z=INT(Z): IF Z<1 OR Z>3 THEN 120
190 ON Z GOTO 200,300,400
200 PRINT "Choice one":END
300 PRINT "Choice two":END
400 PRINT "Choice three":END

```

End

mentals, try Search String in Program Listing 1. In this program, search string A\$ equals "The Quick Brown Fox" and the sought string becomes whatever you enter.

Type in "brown," then type in "BROWN." The results show that the search is exact: The upper- and lower-case characters in the search string

must match those of the target string or Basic returns a zero.

You can use INSTR to limit choices

System Requirements

Models III, 4, and 1000
Basic or GW-Basic

MEGABYTES FOR MINI-BUCKS

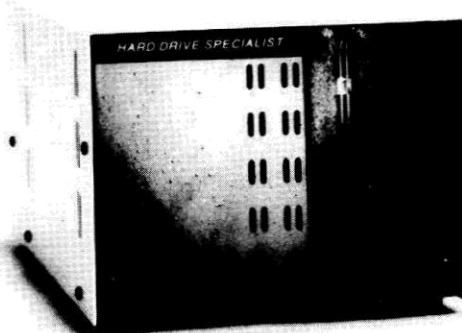
Model 1, 3, 4 Hard Drives

	Primary	Secondary
5 Megabyte —	\$ 795.	\$ 595.
10 Megabyte —	\$1095.	\$ 895.
15 Megabyte —	\$1295.	\$1095.
30 Megabyte —	\$1895.	\$1695.

(Model 1 add \$50.)

TRS-80 Hard Disk Subsystem Features*

- All sizes rated after formatting
- TRS-80 Models 1,3,4, and 4P supported
- Your choice of DOSPLUS, LDOS, or TRSDOS 6.x Software Drivers included.
- Newdos 80/Version 2.5 Systems available.
- Up to two secondary drives may be added.
- Error checking and correcting controller.
- Buffered seek drives for improved access time.
- Built in power up diagnostics.
- Drives use plated media for long disk life.
- Heavy duty power supply.
- Fan cooled.
- Gold connectors used throughout for high reliability.
- 1 year warranty



Shop and compare. Hard Drive Specialist has been building hard drive systems for years and have sold thousands of subsystems to satisfied TRS-80 customers. We fully support TRS-80 Models 1,3,4, and 4P computers on available hard drive operating systems. We use the latest state-of-the-art drives and controllers. Our drives all use buffered seek logic and plated media to result in almost one-fourth the average access times found on our competitors drives. Plated media results in longer platter life and high resistance to head crashers not found on coated media drives. We utilize high construction throughout including heavy duty power supply, cooling fan and gold edge card connectors. We back our drives with a one year parts and labor warranty and we're so sure that you'll like our drive that we offer a thirty day money back guarantee. So when it comes time to buy, look beyond the price and choose the best drive. After all, we are the Hard Drive Specialist!

HDS Multiplexer

\$1295.

The HDS Multiplexer allows the usage of up to 4 Model III or IV systems using Dosplus 3.5, LDOS, TRSDOS 6.x, and DOSPLUS IV on a HDS Hard Drive. The standard package includes the Master Control Unit, Host Adapters for 2 Computers and 40' of cable. Each additional Host adapter add \$150. Each additional foot of cable add \$1. up to 100 feet per computer.

Tandy 1000 Hardware

Tandy 1000

TanPak

The first and only board that your Tandy 1000 may ever need. Your 1000 is very versatile, new applications and functions are being developed for it every day. And now with the HDS TanPak you can keep your options open for tomorrow's technology. As you know the Tandy 1000 only has 3 expansion slots, and those are not quite PC compatible. The TanPak does the job using one expansion slot that normally would require four using Tandy boards. The TanPak includes a Serial Port, a Clock, and sockets for up to 512K of Memory Expansion. And the best part of all, it will save you some big bucks over the Tandy boards.

TanPak 128K \$399.

Radio Shack and Tandy are trademarks of Tandy Corporation. TanPak, and TanTel are trademarks of Compukit Corporation.

Model 3/4 Boot Rom \$39.95

Allows you to boot directly from a HDS Hard Drive using DOSPLUS. Versions available for usage with and without Multiplexer.

AS SEEN AT THE RADIO SHACK COMPUTER SHOWCASES

Hard Drive Kit

Put a 10 Megabyte Hard Drive inside your Tandy 1000. This Hard drive subsystem includes an interface card and a Half-Height Hard Drive that directly replaces a floppy disk drive in both size and power consumption drive.

10 Megabyte Internal Drive System \$895.

10 Megabyte External Drive System \$1095.

15 Megabyte External Drive System \$1395.

30 Megabyte External Drive System \$1895.

Disk Drives

Fast stepping add on or replacement disk drives for half the Radio Shack price \$149.

HARD DRIVE SPECIALIST

Ordering Information

Use our Watts line to place your order Via Visa, MasterCard, or Wire Transfer. Or Mail you payment directly to us. Any non-certified funds will be held until proper clearance is made. COD orders are accepted as well as purchase orders from government agencies. Most items are shipped off the shelf with the exception of hard drive products that are custom built. UPS ground is our standard means of shipping unless otherwise specified. Shipping costs are available upon request.

1-713-480-6000

Order Line 1-800-231-6671

16208 Hickory Knoll,
Houston, Texas 77059

BASIC TAKES

to Basic prompts as well. First, a long version:

```
100 INPUT "WANT TO CONTINUE <Y>ES  
OR <N>O";A$  
110 IF A$<>"Y" AND A$<>"y" AND  
A$<>"N" AND A$<>"n" THEN CLS:  
GOTO 100  
120 PRINT "Okay."
```

This works, but considering upper- and lowercase forms is cumbersome. It's especially onerous if the prompt leaves many possible answers.

Consider this alternative:

```
100 CLS: PRINT "WANT TO CONTINUE:  
YES OR NO?"  
110 A$=INKEY$: Z=INSTR("YNyn",A$)  
120 IF A$= "" OR Z=0 THEN 110  
130 PRINT "Okay."
```

This program gives results with a single keystroke by searching a string containing the first letters of all legal answers.

In Input Menu in Program Listing 2, I've demonstrated the standard way to use input to direct program execution.

To do the same thing using INSTR, try INSTR Menu in Program Listing 3. It combines INSTR with the live keyboard action of INKEY\$. Line 170

Program Listing 3. INSTR Menu.

```
100 REM * INSTR MENU *  
110 REM * Won't work on Model I *  
120 CLS: PRINT "The Menu:"  
130 PRINT "<F>irst"  
140 PRINT "<S>econd"  
150 PRINT "<T>hird"  
160 PRINT:PRINT "Press F, S or T for choice."  
170 A$=INKEY$: Z=INSTR("FSTfst",A$)  
180 IF A$="" OR Z=0 THEN 170  
190 ON Z GOTO 200,300,400,200,300,400  
200 PRINT "Choice one":END  
300 PRINT "Choice two":END  
400 PRINT "Choice three":END  
410 END
```

End

Program Listing 4. Sandwich Shop.

```
100 REM * SANDWICH SHOP *  
110 CLS: CLEAR 500  
120 A$="BOLOGNA CHEESE TURKEY PASTRAMI HAM"  
130 FOR X=1 TO 5  
140 INPUT "NAME PLEASE ";NS  
150 PRINT:PRINT "HERE'S THE SELECTION":PRINT:PRINT A$  
160 PRINT: INPUT "WHAT DO YOU WANT";CS  
170 Z=INSTR(A$,CS)  
180 IF Z=0 THEN CLS: PRINT "WE AIN'T GOT IT": GOTO 150  
190 A$=LEFT$(A$,Z-1)+MIDS(A$,Z+1,LEN(CS))  
200 XS=X$+NS+" GETS "+CS+". "  
210 CLS: NEXT X  
220 PRINT "LEMMIE READ BACK YOUR ORDERS."  
230 PRINT XS  
240 END
```

End

contains an INSTR test. The string FSTfst combines all legal answers to the menu prompt.

Now try running Sandwich Shop in Program Listing 4. The A\$ variable

contains the names of the five sandwiches available. Five people type in their names and select from the available menu.

In line 170, the program uses IN-

Circle 71 on Reader Service card.

T80-FS1 Flight Simulator



See your dealer!

Available for Model I or Model III. \$25.00
on cassette or \$33.50 on disk (with
enhancements) All versions require 16K.

If you order direct, please specify whether you have Model I or Model III (the media are different) and whether you want disk or cassette. Include \$1.50 and indicate UPS or first class mail. Illinois residents add 5% sales tax. Visa and Mastercard accepted.

If you don't yet own a disk, don't fret. You can upgrade anytime. Cassette users may send back their cassette (but not the manual) along with \$10 (first class shipping included) and receive the disk version.

subLOGIC
Communications Corp.
713 Edgebrook Drive
Champaign, IL 61820
(217) 359-8482
Telex: 206995

Program Listing 5. Sequence Search.

```

100 REM * Sequence Search *
120 CLS: A$="red red blue red green red green blue blue"
130 INPUT "Color sought":BS
140 X=1
150 Z=INSTR(X,A$,BS)
160 IF Z>0 THEN C=C+1: X=Z+LEN(B$): GOTO 150
170 PRINT BS" occurs" C"times in"
180 PRINT A$: END

```

End

STR to test whether the requested sandwich is available. If it is, the program assigns the choice to the requestor's name and removes the sandwich from the menu (line 190) using the value Z from the INSTR test. This line reshapes A\$ by removing the chosen sandwich word from the string and uniting the two orphan strings.

If the selected sandwich is unavailable, line 180 displays a message to that effect and prompts you to make another choice.

Sequence Search in Program Listing 5 uses the same INSTR(X,search, sought) form. You could use this listing as a routine in another program. It counts the number of times the same set of characters occurs in a string.

Run the program and type in the name of the color for which you're searching. The computer displays the number of times the color appears in the string.

Line 160 is the heart of the program. When Z (the number of the first occurrence) is greater than zero, the program has found an occurrence, and it limits the search to the right of the search string by making X equal Z plus the length of the characters just found.

INSTR Applications

The aim of using INSTR is to obtain a number representing the start of a sought string within a search string. You can then use that number to achieve further goals. This is where

If...Then tests become useful. Consider these plain-English applications:

- Examine 1984 receipts, adding individual sales to arrays MONTHS(1)-MONTHS(12) based on the corresponding month names, then print a bar graph of the findings.
- Go through a document file and feed what you find into a new file. In every case where you find the character string "Screem," replace it with "Screen."
- Separate all employees into groups reflecting years of service.

INSTR("NEXT", "MONTH")

I hope these examples have given you ideas on how to use INSTR in your own programs. It's the If... Then test that lends resilience and complexity to the moves you can make within a program.

Next month I'll discuss how to limit user responses to prevent improper program entries. See you then. ■

Contact Richard Ramella at 1493 Mt. View Ave., Chico, CA 95926.

Circle 214 on Reader Service card.

TANDY™ "CAN YOU BUY DIRECT?" COMPUTERS WILL YOU PAY TOO MUCH?

SERVICE AND WARRANTY NATIONWIDE

Ask About Our
"30 Days
Buy - Back - Policy"



TANDY 6000 - 1 MEG-BYTE RAM



DT-100 38K bps



**SAVE SALES TAX*
PLUS DISCOUNT**

*Texas Residents Add Only 4 1/8%

FORT WORTH COMPUTERS

WE ARE SERIOUS ABOUT SAVING YOU MONEY

(Located 30 miles from Fort Worth)

377 Plaza • GRANBURY • NR FORT WORTH, TEXAS 76048

CALL FREE NUMBER: 1-800-433-S-A-V-E

Monday thru Friday — 9:00 a.m. to 5:00 p.m. Texas Time
(Order Inquiries/Customer Service &) IN TEXAS: 817-573-4111



For
Prices
Call



* TRADEMARK
OF TANDY CORP.

Program Access In One Easy Step

If you have a Model 4/4P running TRSDOS 6.2, try typing in an asterisk at the TRSDOS Ready prompt. Your computer will respond with the message "No command <*> present, as SYS13." Now type in "MEMORY (ADD = "E", BYTE = X'80")" at TRSDOS Ready; you'll see the message "No Extended Command Interpreter Present, as SYS13." You have just stumbled across two of TRSDOS 6.2's most interesting capabilities, the immediate execution program (IEP) and the extended command interpreter (ECI).

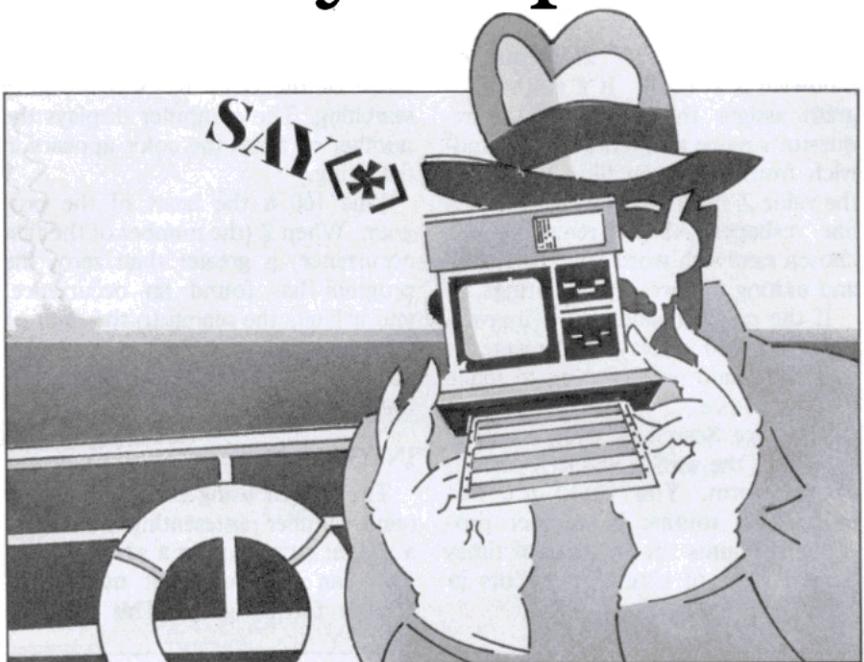
These two features represent an undefined system file that lets you create a program that permanently circumvents the TRSDOS Ready prompt and becomes your resident system program.

The undefined system file is SYS13. You won't find either the IEP or the ECI with TRSDOS 6.1; they're available in TRSDOS 6.2 only.

Although interesting, two new error messages might seem of little practical value. However, the IEP and the ECI can be of great help. Before I explain how to use them, I'll discuss how TRSDOS 6.2 works.

TRSDOS 6.2's Operation

When you boot up a TRSDOS 6.2 disk, the system prompts you for the date. It then configures itself according to the information in the CONFIG/SYS file, which you create with the SYSGEN.command (more about this later). Then TRSDOS checks the system disk for an Auto command and, if it finds one, executes it. Fi-



nally, TRSDOS checks EFLAG\$, the fifth byte in its flag table. If that byte is set to zero, the TRSDOS Ready prompt appears on the screen and the command interpreter in SYS1/SYS takes control of the computer.

However, if EFLAG\$ assumes any nonzero value, TRSDOS loads and runs SYS13/SYS. It also checks EFLAG\$ and automatically runs SYS13 every time a program returns to DOS using the @Abort or @Exit supervisory call (SVC).

TRSDOS recognizes one shorthand entry while it runs the normal SYS1/SYS interpreter: the asterisk key, which commands it to load and run whatever program resides in SYS13/SYS. Here is where the IEP or the ECI comes into play. They are actually two different versions of the same utility; since they both use SYS13/SYS, you can't use them together. The IEP is the easiest to use, so I'll begin with that.

Using an IEP

You can put any machine-language program (including Basic) in SYS13/SYS and execute it by typing in an asterisk at TRSDOS Ready. Use this

Copy command to load one of your programs into SYS13/SYS:

```
COPY MYPROG/CMD TO SYS13/SYS.  
LSIDOS (C = N)
```

To execute Basic automatically, use:

```
COPY BASIC/CMD.BASIC TO SYS13/  
SYS.LSIDOS (C = N)
```

The password for SYS13 (and almost all other system files) is LSIDOS; the password for Basic is, simply, "Basic." The parameter (C = N) at the end of the Copy command tells the system not to transfer the file attributes along with the file. If you leave out that command, TRSDOS won't recognize SYS13 as a system file, and the IEP won't work.

OK, I agree that being able to boot up a program by typing in one character instead of a possible 20 characters is handy, but hardly earthshattering. Things get more interesting if your system program changes EFLAG\$. From then on, until you reboot your system (or until your program sets EFLAG\$ equal to zero again and exits to TRSDOS), you'll never see the TRSDOS Ready prompt. Whenever you finish running almost any soft-

System Requirements

Model 4



64K RAM

TRSDOS 6.2

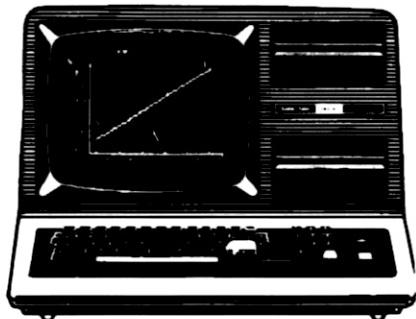
Assembly language

Editor/assembler

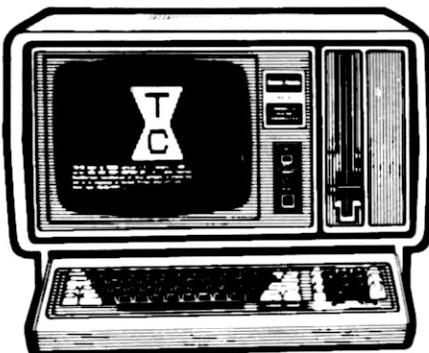


ELECTRONICS

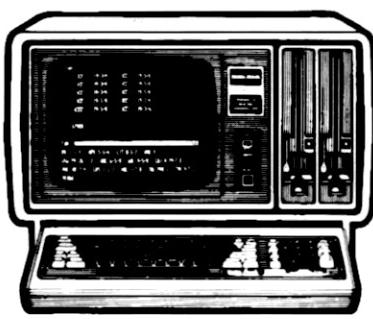
MODEL 4



MODEL 6000



MODEL 12



256K MOD 2000 W/MONO MONITOR	2079.00	DMP 105 PRINTER.....	145.00
256K MOD 2000 W/COLOR MONITOR	2379.00	DMP 110 PRINTER.....	269.00
256K MOD 1200 HD 1 DR.	2009.00	DMP 120 PRINTER.....	349.00
128K MOD 1000 W/MONO 2 DR.	1259.00	DMP 430 PRINTER.....	585.00
128K MOD 1000 W/COLOR 2 DR.	1519.00	DMP 2100P PRINTER	1489.00
24K MOD 100 PORT	469.00	CGP 220	499.00
24K MOD 200 PORT	769.00	DWP 510 PRINTER	1139.00
64K MOD 4 2DR.	925.00	TRACTOR DWP 210	99.00
64K MODEL 4P 2DR.	935.00	TRACTOR DWP 11/510	159.00
512K MOD 6000 2DR.	3479.00	TRACTOR FEED DMP2100P	115.00
80K MOD 12 2DR.	2719.00	PARALLEL PRINTER SWITCH	96.00
15 MEG HARD DISK	1519.00	PARALLEL PRINTER CONTROLLER	179.00
35 MEG HARD DISK	2309.00	PARALLEL PRINTER CABLE	29.00

100% RS COMPONENTS NO FOREIGN DRIVES OR MEMORY FULL WARRANTY

ALL RS SOFTWARE 20% OFF CATALOG PRICE

CASHIERS CHECK OR MONEY ORDER MUST ACCOMPANY ALL ORDERS

(817) 825-4027

NOCONA ELECTRONICS • BOX 593 • NOCONA, TX 76255

THE NEXT STEP

Program Listing. Demonstration of an extended command interpreter.

```

88110      TITLE   "Model 4 Interface -- Hardin Brothers"
88120 ;   "Friendly Model 4 Interface"
88130 ;   Hardin Brothers, 12/30/84
88140 ;
88150 ;   See text for installation procedures
88160 ;
88170 ;
88180 ;List of SVCs used:
88190 ;
88200 @ABORT EQU    21
88210 @CKBRC K EQU   186
88220 @CLS   EQU    185
88230 @CMNDI EQU    24
88240 @DSP   EQU    2
88250 @DPLY  EQU    10
88260 @ERROR EQU    26
88270 @FLAGS EQU    101
88280 @KEY   EQU    1
88290 @MUL8  EQU    98
88300 @VDCTL EQU    15
88310 ;
88320 ;ASCII Equates:
88330 ;
88340 ETX   EQU    03H
88350 CR    EQU    0DH
88360 LFTARW EQU    08H
88370 RTARW EQU    09H
88380 DWARW EQU    0AH
88390 UPARW EQU    0BH
88400 CURSOR EQU    0EH
88410 CURFOF EQU    0FH
88420 INVON EQU    10H
88430 ;
88440 PSECT  3000H   ;Start in free memory
88450 START  SVC    #FLAGS   ;Point IY=> Flag Table
88460 LD     (STKSAV),SP ;Save the stack pointer
88470 SVC    @CKBRC K ;Check and clear BREAK bit
88480 JR     Z,STARTA ;Go if no break
88490 ;
88500 LEAVE  XOR    A,0      ;A = 0
88510 LD     (IY+'E'-'A'),A ;Set EFLAGS to 0
88520 LD     C,CURSON ;Set cursor on
88530 SVC    @DSP   ;Send to *DO
88540 JP     NZ,ERROR ; Error trap
88550 SVC    @CLS   ;And clear the screen
88560 JP     NZ,ERROR ; Error trap
88570 SVC    @ABORT ;And leave
88580 ;
88590 STARTA LD    A,(IY+'E'-'A') ;Get current EFLAGS
88600 OR    A          ;Test it
88610 JR    NZ,SETUP  ;Go if set non-zero
88620 CPL   ;Else make non-zero
88630 LD    (IY+'E'-'A'),A ;And store it
88640 ;
88650 SETUP  BIT    0,A      ;Have we been here once?
88660 JR    NZ,SETUPA ;Go if not
88670 LD    A,0FFH   ;Set flag to 0FFH
88680 LD    (IY+'E'-'A'),A ;Store in EFLAGS
88690 LD    HL,WAITMSG ;HL=> 'Press a key...'
88700 SVC    @DPLY  ;Display it
88710 JP     NZ,ERROR ; Error trap
88720 SVC    @KEY   ;Wait for a key
88730 JP     NZ,ERROR ; Error trap
88740 SETUPA SVC    @CLS   ;Clear the screen
88750 JP     NZ,ERROR ; Error trap
88760 LD    HL,HELLO ;HL=> Opening message
88770 SVC    @DPLY  ;Put it on the screen
88780 JP     NZ,ERROR ; Error trap
88790 ;
88800 CALL   DISPLAY ;Show options
88810 CALL   SELECT  ;Make a choice
88820 JP     COMMAND ;And do it
88830 ;
88840 ;
88850 ;DISPLAY
88860 ;   Read through the list of options, and display each on the
88870 ;   screen in 4-across format.
88880 ;
88890 ;
88900 DISPLAY LD    C,CURFOF ;Turn off cursor
88910 SVC    @DSP   ;Send to *DO
88920 JP     NZ,ERROR ; Error trap
88930 LD    IX,OPTBL ;IX=> Options & addresses
88940 DLOOP  LD    A,(IX)  ;Get Option #
88950 OR    A          ;Is it 0?
88960 RET    Z          ;If so, we're done here
88970 CALL   SET_RC ;Set Row/Col in HL
88988 LD    B,3      ;Select "Set Cursor"
88998 SVC    @VDCTL ;Set the cursor
89000 JP     NZ,ERROR ; Error trap
89010 LD    L,(IX+1) ;Get LSB of option message
89020 LD    H,(IX+2) ; And MSB
89030 SVC    @DPLY  ;Display it
89040 JP     NZ,ERROR ; Error trap
89050 INC    IX          ;Bump IX
89060 INC    IX          ; three times to
89070 INC    IX          ; next position
89080 JR    DLOOP  ;Repeat until done
89090 ;
89100 ;
89110 ;SELECT
89120 ;   User can move inverse block around screen with arrow keys,
89130 ;   select option under block with <ENTER>, or go to TRSDOS
89140 ;   with <BREAK>.
89150 ;
89160 ;
89170 SELECT LD    C,INVON ;Set inverse bit
89180 SVC    @DSP   ;Send to *DO
89190 JP     NZ,ERROR ; Error trap
89200 LD    A,1      ;Start with first option
89210 LD    (CURRENT),A ;Set as current
89220 LD    (NEW),A ; and as next
89230 SEL10  CALL   SETNEXT ;Erase old & set new inverse
89240 SVC    @CKBRC K ;Check for break key
89250 JP     NZ,LEAVE ;Go if <BREAK> hit
89260 SVC    @KEY   ;Get a keystroke
89270 JP     NZ,ERROR ; Error trap
89280 CP    CR+1    ;Larger than <ENTER>?
89290 JR    NC,SEL10 ;Loop back if yes
89300 ;
89310 CP    CR          ;Is it an <ENTER>?
89310 JR    NZ,LEFT   ;Go if not <ENTER>
89320 LD    A,(CURRENT) ;Get current choice
89330 RET    ;And return
89340 ;
89350 LEFT   CP    LFTARW ;Left arrow?
89360 JR    NZ,RIGHT  ;Go if not
89370 LD    A,(CURRENT) ;Get current option
89380 CP    2          ;Must be at least 2nd
89390 JR    C,SEL10   ;Go if can't back up
89400 DEC   A          ;Else decrement A
89410 LD    (NEW),A ;Set new value
89420 JR    SEL10    ;And loop back
89430 ;
89440 RIGHT  CP    RTARW ;Right arrow?
89450 JR    NZ,DOWN   ;Go if not
89460 LD    A,(CURRENT) ;Get current option #
89470 CP    MAXOP  ;Compare with maximum value
89480 JR    NC,SEL10   ;Go if already at top
89490 INC   A          ;Else increment A
89500 LD    (NEW),A ;Save as new value
89510 JR    SEL10    ;And loop back
89520 ;
89530 DOWN   CP    DWARW ;Down arrow?
89540 JR    NZ,UP     ;Go if not
89550 LD    A,(CURRENT) ;Get current option #
89560 ADD   A,4      ;Add 4 for next row
89570 CP    MAXOP+1 ;Over the top?
89580 JR    NC,SEL10   ;Go if too high
89590 LD    (NEW),A ;Else set new value
89600 JR    SEL10    ;And loop back
89610 ;
89620 UP    CP    UPARW ;Up arrow?
89630 JR    NZ,SEL10   ;Go if not
89640 LD    A,(CURRENT) ;Get current option #
89650 SUB   5          ;Move up row + 1
89660 JR    C,SEL10   ;Go if too low
89670 INC   A          ;Correct to Current - 4
89680 LD    (NEW),A ;Set new value
89690 JR    SEL10    ;And loop back
89700 ;
89710 ;
89720 ;COMMAND
89730 ;   A = current option choice,
89740 ;   Point HL ==> action for this choice, and then use @CMNDI to
89750 ;   execute it.
89760 ;   @CMNDI does not return, but EFLAGS is set, so control will be
89770 ;   passed back to this program after action is completed.
89780 ;
89790 ;
89800 COMMAND LD    HL,CMDTBL-2 ;HL==> List of addresses
89810 ADD   A,A      ;Multiply A * 2
89820 ADD   A,L      ;Add to pointer
89830 LD    L,A      ;And save it
89840 JR    NC,CL    ;Go if no carry
89850 INC   H          ;Else bump H
89860 C1    LD    E,(HL) ;Get LSB of action address
89870 INC   HL        ;Bump HL
89880 LD    D,(HL)   ; And MSB of action address
89890 EX    DE,LINE  ;HL==> Action line
89900 LD    C,CURSON ;Turn on cursor
89910 SVC    @DSP   ;Send to *DO
89920 JP     NZ,ERROR ; Error trap
89930 SVC    @CLS   ;Clear the screen
89940 JP     NZ,ERROR ; Error trap
89950 LD    A,0AH   ;Show we've been here
89960 LD    (IY+'E'-'A'),A ;Set the EFLAG
89970 SVC    @CMNDI ;And go do it
89980 ;   Note -- there is no return from @CMNDI
89990 ;
90000 ;
90010 ;ERROR
90020 ;   The ERROR routine displays the current error message
90030 ;   then starts this program over again.
90040 ;   Error code is in A register on entry.
90050 ;
90060 ERROR  OR    1188000000 ;Set for short message and return
90070 LD    C,A      ;Error code in C
90080 SVC    @ERROR ;Display the error
90090 LD    HI,WAITMSG ;HL==> Our message
90100 SVC    @DPLY  ;Display it
90110 JP     NZ,ERROR ; Error trap
90120 SVC    @KEY   ;Get any keystroke
90130 JR    NZ,ERROR ; Error trap
90140 LD    SP,(STKSAV) ;Clear the stack
90150 JP    START  ;Start program over
90160 ;
90170 ;
90180 ;SET_RC
90190 ;   Option # is in A register. Set HL so that
90200 ;   H ==> Row that option is displayed on
90210 ;   L ==> Column for option display
90220 ;   Preserve other registers
90230 ;
90240 ;
90250 SET_RC PUSH  BC          ;Save BC pair
90260 PUSH  DE          ;And DE
90270 DEC   A           ;Work with A-1
90280 PUSH  AF          ;Save A register
90290 LD    HL,(TOP_RC) ;Get top row and column
90300 SRL   A          ;A/2
90310 SRAL  A          ;A/4
90320 ADD   A,H        ;Add to row counter
90330 LD    H,A        ;And save
90340 POP   AF          ;Recover A register
90350 PUSH  AF          ;And save again
90360 AND   @3H        ;A MOD 4
90370 LD    C,A      ;Store in C
90380 LD    E,24D   ;Multiplier
90390 SVC    @MUL8 ;Multiply: A = C * E
90400 LD    L,A      ;Set as column
90410 POP   AF          ;Recover original A
90420 INC   A           ;Reset to original value
90430 POP   DE          ;And DE
90440 POP   BC          ;And BC
90450 RET    ;
90460 ;

```

Listing continued

THE NEXT STEP

Listing continued

```

82478 ;-----  

82480 ;SETNEXT  

82490 ; Remove the inverse print from the old (current) option, and  

82500 ; add it to the new option. Then set CURRENT = NEW.  

82510 ;-----  

82520 ;-----  

82530 SETNEXT LD DE,LINEBUF ;DE==> 80 char. line buffer  

82540 LD A,(CURRENT) ;Get current option #  

82550 CALL SET_RC ;Get row number  

82560 PUSH HL ;Save L register  

82570 LD BC,0901H ;Set "Move line to memory"  

82580 SVC @VDCCTL ;Do it  

82590 JP NZ,ERROR ; Error trap  

82600 POP HL ;Recover HL pointer  

82610 PUSH HL ; and save again  

82620 LD H,0 ;HL == start column of option display  

82630 LD DE,LINEBUF ;DE ==> line buffer  

82640 ADD HL,DE ;HL ==> Start of option label  

82650 LD B,17 ;Number of characters to change  

82660 SET10 LD A,(HL) ;Get a character  

82670 AND 7FH ;Clear high bit  

82680 LD (HL),A ;Put it back  

82690 INC HL ;Point to the next  

82700 DJNZ SET10 ;Repeat for 17 characters  

82710 POP HL ;H ==> Screen row again  

82720 LD BC,0900H ;Select "Move memory to line"  

82730 SVC @VDCCTL ;Put line back on screen  

82740 JP NZ,ERROR ; Error trap  

82750 ;-----  

82760 LD DE,LINEBUF ;Now start again  

82770 LD A,(NEW) ;Get new option #  

82780 LD (CURRENT),A ;Save as current #  

82790 CALL SET_RC ;Get row number  

82800 PUSH HL ;Save L register  

82810 LD BC,0901H ;Set "Move line to memory"  

82820 SVC @VDCCTL ;Do it  

82830 JP NZ,ERROR ; Error trap  

82840 POP HL ;Recover HL  

82850 PUSH HL ;And save again  

82860 LD H,0 ;HL == start column of option display  

82870 LD DE,LINEBUF ;DE ==> Line buffer again  

82880 ADD HL,DE ;HL ==> Start of option label  

82890 LD B,17 ;Number of characters to change  

82900 SET20 LD A,(HL) ;Get a character  

82910 OR 80H ;Set high bit  

82920 LD (HL),A ;Put it back  

82930 INC HL ;Point to the next  

82940 DJNZ SET20 ;Repeat for 17 characters  

82950 POP HL ;H ==> Screen row again  

82960 LD BC,0900H ;Select "Move memory to line"  

82970 SVC @VDCCTL ;Do it  

82980 JP NZ,ERROR ; Error trap  

82990 RET ;-----  

83000 ;-----  

83020 ; List of storage locations and constants  

83030 ;-----  

83040 ;-----  

83050 STKSAV DEFW $-$ ;Room to save stack pointer  

83060 CURRENT DEFW $-$ ;Current option  

83070 NEW DEFW $-$ ;Next option  

83080 TOP_RC DEFW 0400H ;Start row & column for Option list  

83090 MAXOP EQU 10D ;# Options available  

83100 LINEBUF DEFW 80 ;Buffer for screen line  

83110 ;-----  

83120 OPTTBL DEFW 1 ;Table of display messages  

83130 DEFW OPT1 ;for each option  

83140 DEFW 2  

83150 DEFW OPT2  

83160 DEFW 3  

83170 DEFW OPT3  

83180 DEFW 4  

83190 DEFW OPT4  

83200 DEFW 5  

83210 DEFW OPT5 ;-----  

83220 DEFB 6  

83230 DEFW OPT6  

83240 DEFB 7  

83250 DEFW OPT7  

83260 DEFB 8  

83270 DEFW OPT8  

83280 DEFB 9  

83290 DEFW OPT9  

83300 DEFB 10  

83310 DEFW OPT10  

83320 DEFB 8 ;Mark end of table  

83330 ;-----  

83340 CMDTBL DEFW CMD1,CMD2 ;Table of action commands for  

83350 DEFW CMD3,CMD4 ;each option.  

83360 DEFW CMD5,CMD6,CMD7,CMD8,CMD9,CMD10  

83370 ;-----  

83380 ;-----  

83390 ; Messages, option displays, and option actions  

83400 ;-----  

83410 ;-----  

83420 HELLO DEFW 192+28 ;Tab 28 spaces  

83430 DEFPM 'The Friendly Model 4'  

83440 DEFW DWNARW ;Line feed  

83450 DEFW 192+8  

83460 DEFPM 'Use arrows to move, <ENTER> to select,'  

83470 DEFPM '<BREAK> to go to TRSDOS'  

83480 DEFPM CR  

83490 ;-----  

83500 WAITMSG DEFPM 'Press any key to continue'  

83510 DEFPM CR  

83520 ;-----  

83530 OPT1 DEFPM 'Catalog--Drive 1' ;List of display messages  

83540 DEFPM ETX  

83550 OPT2 DEFPM 'Catalog--Drive 2'  

83560 DEFPM ETX  

83570 OPT3 DEFPM 'Format Drive 1'  

83580 DEFPM ETX  

83590 OPT4 DEFPM 'Format Drive 2'  

83600 DEFPM ETX  

83610 OPT5 DEFPM 'Backup Dr 1 => 2'  

83620 DEFPM ETX  

83630 OPT6 DEFPM 'Backup Dr 2 => 1'  

83640 DEFPM ETX  

83650 OPT7 DEFPM 'Print File 1'  

83660 DEFPM ETX  

83670 OPT8 DEFPM 'Print File 2'  

83680 DEFPM ETX  

83690 OPT9 DEFPM 'Run Program 1'  

83700 DEFPM ETX  

83710 OPT10 DEFPM 'Run Program 2'  

83720 DEFPM ETX  

83730 ;-----  

83740 CMD1 DEFPM 'CAT :1' ;List of actions  

83750 DEFPM CR  

83760 CMD2 DEFPM 'CAT :2'  

83770 DEFPM CR  

83780 CMD3 DEFPM 'FORMAT :1 (CYL=40,DDEN,ABS,Q=N)'  

83790 DEFPM CR  

83800 CMD4 DEFPM 'FORMAT :1 (CYL=40,DDEN,ABS,Q=N)'  

83810 DEFPM CR  

83820 CMD5 DEFPM 'BACKUP /DAT:1 TO :2'  

83830 DEFPM CR  

83840 CMD6 DEFPM 'BACKUP /DAT:2 TO :1'  

83850 DEFPM CR  

83860 CMD7 DEFPM 'LIST FILE1/DAT:1 (P)'  

83870 DEFPM CR  

83880 CMD8 DEFPM 'LIST FILE2/DAT:1 (P)'  

83890 DEFPM CR  

83900 CMD9 DEFPM 'PROGRAM11'  

83910 DEFPM CR  

83920 CMD10 DEFPM 'BASIC PROGRAM2/BAS (F=5,M=63450)'  

83930 DEFPM CR  

83940 ;-----  

83950 END START

```

End

ware, TRSDOS loads the program stored in SYS13 and it takes over. Unlike a program Auto calls, which runs once and then quits, your SYS1 program becomes the system program and you can't return to TRSDOS Ready unless your program lets you.

Enter the ECI

This technique is especially useful in creating a new user interface for TRSDOS. By using an ECI, a user never need worry about parameters or dummy devices. You can give the Model 4 whatever kind of user interface you want.

The Program Listing, which makes a Model 4 look a little like a Model 100, demonstrates one possibility. The user only needs to move the cursor to select one of a limited set of com-

mands. He won't have to worry about a command string like "BASIC MY-PROG (F = 5,M = 62000)" when the computer can do it instead. Once you install this program, a user will never see the TRSDOS Ready prompt.

I used the ALDS assembler for my program; if you use EDAS or Pro-Create, you'll have to change line 440 from PSECT 3000H to ORG 3000H and define an SVC macro at the beginning of the program like this:

```

SVC MACRO #SVC
LD A, #SVC
RST 28H
ENDM

```

The program should be easy to understand, but I'll explain a couple of the routines. First, the program uses EFLAG\$ for two different purposes. The beginning of the program checks

EFLAG\$. If you invoke the program with the asterisk key, EFLAG\$ will be set at zero (assuming you've copied the program into SYS13). The SYS1 program sets EFLAG\$ to 0FF hexadecim (hex) to change itself from an IEP to an ECI, clears the screen, and gets to work.

If SYS1 finds EFLAG\$ set to 0FF hex instead of zero, it leaves the flag alone and immediately displays the options screen. However, if it finds EFLAG\$ set to 80 hex, it displays a "Press any key" message and waits before displaying the options screen. This last feature is necessary because an immediate clear would erase important information left on the screen by commands like DIR before a user has a chance to read it. To signal the pause, the program sets EFLAG\$ to

Circle 230 on Reader Service card.

USE YOUR HOME COMPUTER TO TRACE
YOUR FAMILY ROOTS WITH

MICRO ROOTS

7411 Riggs Road, Suite A 104
Adelphi, MD 20783 • 301-460-0754

- The bi-monthly newsletter for the personal/home micro computer user. • Details cost, source and availability of 57 genealogical programs & features for 21 different personal/home computers.
- Articles written by other users and professionals. • Clearing house for genealogical Remote Bulletin Board Systems (RBBS).
- Questions answered, problems solved, information and experiences shared. • Ideal newsletter/journal for the user at any level including beginners.

Cut out, place in an envelope and mail to:

MICRO ROOTS

7411 Riggs Road, Suite A 104 Adelphi, Maryland 20783
Yes, enclosed is my check or money order for \$24.95.
Please send me a subscription for Microroots.

Name _____
Address _____
City _____ State _____ Zip _____



NOW JUST \$24.95
ANNUAL SUBSCRIPTION
INCLUDES:
• 12 ISSUES
• CLEARING HOUSE
• GENEALOGICAL
• RBBS

Circle 207 on Reader Service card.

wabash®

When it comes to
Flexible Disks, nobody
does it better than
Wabash.

MasterCard, Visa Accepted.
Call Free: (800) 235-4137



PACIFIC
EXCHANGES
100 Foothill Blvd.
San Luis Obispo, CA
93401 (In Cal. call
(805) 543-1037)

Circle 249 on Reader Service card.

HUNT & PECK



Is fine for chickens.

You, however, can use **FasType™**. "FasType™" is a versatile machine language program that teaches touch typing and keyboard functions. Written by teachers. Classroom proven. Specify TRS-80 Model III or 4.

Send check for \$39.95/disk plus
\$1.50 shipping to:

Press A Software
Box 364
Jerome, AZ 86331
602-634-2688

104 • 80 Micro, May 1985

THE NEXT STEP

80 hex before executing any user command.

Three main routines follow the program's setup section. The first displays the available options on the screen, the second lets a user move an inverse block around to pick an option, and the third executes the commands related to whatever option the user chose. My program executes all commands through the @CMNDI SVC, which sends a string to TRSDOS and lets the DOS parse and execute it. With a little more programming, you could make the interface display messages, prompt for more information, or send multiple commands like JCL does.

The inverse print block that the program uses as a cursor works because of the Model 4's video hardware. With inverse print on, TRSDOS displays any character sent to video memory with the high bit set in inverse video. If inverse print is off, the same values are displayed as graphics blocks and special characters. (With inverse print on, the DOS *DO driver automatically sets the high bit of every normal character it receives.)

The program turns on inverse print when it's ready to display the inverted block. Then it uses the @VDCTL SVC to read and write lines of text from video memory. Two short loops either set or reset high bits of appropriate characters to make them appear inverted or normal. You can easily modify the two prompts that the screen displays and the action that each causes. The MAXOP value in line 300 defines the number of options in the program. It can be any value between 1 and 80. The OPTTBL (line 303) contains a number and the address of each visual option prompt.

The list of option prompts begins on line 344, and the corresponding list of TRSDOS commands on line 365. You must end each prompt with an ETX (end-of-text) character (CHR\$(03)), and end each action command with a carriage return character. Also, each prompt has a maximum length of 17 characters. Feel free to alter the prompts and the actions as you write the program; the ones I chose are only for demonstration.

When you assemble the program, don't give it the name SYS13/SYS! Instead, name and test it just as you would any other Assembly-language

program until you finish debugging it. Then copy the program into SYS13 with the Copy command shown previously. Test it some more by invoking it with the asterisk command. When you're sure everything works, set EFLAG\$ permanently to OFF hex so the program automatically runs on each reboot.

Changing EFLAG\$

Permanently changing EFLAG\$ is a small problem. You can't use the TRSDOS Memory command and then SYSGEN, because the computer will invoke your program as soon as Memory finishes execution. The easiest solution is to change your configuration file.

Every time you invoke a SYSGEN command, TRSDOS creates a file named CONFIG/SYS that contains all current information on your system, including the value of all flags, any programs held in protected high or low memory, information about your disk drives, and the current device filtering and routing. You can patch that file like any other.

First, give TRSDOS the command MEMORY (ADD = "E"). The computer will display a line of information that includes the address of EFLAG\$. On my system, EFLAG\$ is stored at 006E hex; it's probably at the same location on all current versions of TRSDOS 6.2. Then type in the following command, inserting the appropriate address where shown:

PATCH CONFIG/SYS.CCC (X'006E' = FF)

If you don't get an error message, your new program is now a full-fledged ECI. Press the reset button, and your program has full control of the computer. Anyone who boots that disk will never see TRSDOS Ready and will have whatever kind of simplified user interface you've designed. ■

Contact Hardin Brothers through CompuServe. GO PCS-117 to the Writers' and Editors' SIG (WESIG), and leave your message on section zero of the message board. You can also write to him at 280 N. Campus Ave, Upland, CA 91786. Enclose a self-addressed, stamped envelope if you want a reply.

Circle 355 on Reader Service card.

LARGE CAPACITY ACCOUNTING PROGRAMS

FOR TRS-80 1, 3, 4 & 4P, LNW, LOBO

NEED JUST 2 DRIVES
FOR CAPACITY BELOW

ACCTS RECEIVABLE \$150.00

5000+ ACCOUNTS 15000+ TRANSACTIONS
BALANCE FORWARD 99 TRANSACT CODES
30-60-90-120 AGED STATEMENTS SHOW
DATE / INV # / DESCRIPT / AMT / AGEING
SELECTIVE FINANCE CHARGES & RATES
FAST ENTRY POSTING W/ AUDIT REPORT
SUB - ACCTS, % CREDIT LIMIT DATE OF
LAST PAYMENT, LABELS
ADD \$50.00 FOR INVOICING MODULE
OTHER OPTIONS AVAILABLE - CALL -

ACCTS PAYABLE \$50.00

DERIVED FROM OUR A/R - WRITES CHECKS

GENERAL LEDGER \$150.00

400+ ACCTS 5000+ TRANSACTIONS/MONTH
- BEST LOOKING FINANCIAL STATEMENTS
- DEPARTMENTAL P & L (UP TO 9)
- STATEMENT OF CHANGES
- SUB-TOTALS WHERE YOU WANT
- FAST FLEXIBLE POSTING INPUT
- PERCENTAGE P & L

DEMO AVAILABLE \$20.00 EACH
APPLIES TOWARDS PURCHASE

COMBINATION SPECIALS

1 A/R & G/L FOR \$200.00
2 A/R, A/P & G/L FOR \$225.00
HARD DISK VERSION SLIGHTLY MORE

VISA H.D.P. MC
2366 Lincoln Driville, CA 95965
916-533-5992
MON-FRI 8AM TO 2PM
ADD 300 S & H ADD 300 COD

LARGE CAPACITY SYSTEM
LARGE CAPACITY SYSTEM

Circle 176 on Reader Service card.

FILE TRANSFER + Conversion Utilities

APPLE
TRS
CP/M

IBM PC/XT, JR.	\$129.95
Tandy 1000, 1200, 2000 ..	\$129.95
IBM AT	\$224.95

Products For
NEW
AT

Transfer your Apple, TRS, CP/M to the IBM PC or Compatibles.

Transfers: (no more retyping)

- Visicalc, Multiplan
- Basic, Fortran, Cobol
- ASCII files, data files
- Word processing files

IBM PC/XT, Jr. ←→ Tandy 2000 \$129.95

DISK Transporter transfers files back and forth, includes utilities.

New Products for IBM AT

Drives, 360KB - \$275, 1.2MB - \$450
Hard Drive, 20MB - \$1200, 40MB - \$1800

Prototype Boards & Extender
Cards \$120/ea.

Serial Cables \$85

High Capacity Disks
(1.2MB) \$60/10

PERSONAL COMPUTER PRODUCTS

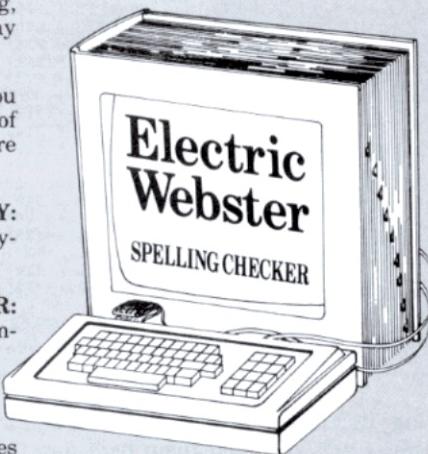


1400 COLEMAN AVE., SUITE C-18 SANTA CLARA, CA 95050
TELEPHONE (408) 988-0164 PHONE ORDERS

IBM, TRS 80 & TANDY, APPLE, CP/M VISICALC, MULTIPLAN ARE RESPECTIVELY REGISTERED TRADEMARKS OF INTERNATIONAL BUSINESS MACHINES CORP., TANDY CORPORATION, APPLE COMPUTER INC., DIGITAL RESEARCH, INC., VISICORP, MICROSOFT CORP.

Circle 45 on Reader Service card.

- **DISPLAYS CORRECT SPELLINGS:** If you don't know the correct spelling, EW will look it up for you, and display the dictionary.
- **VERIFIES CORRECTIONS:** If you think you know the correct spelling of a word, EW will check it for you before making the corrections.
- **HYPHENATES AUTOMATICALLY:** (Optional). Inserts discretionary hyphens throughout text.
- **GRAMMAR & STYLE CHECKER:** (Optional). Identifies 22 types of common errors. Makes suggested corrections with the stroke of a key. Runs within EW.
- **50,000 WORD DICTIONARY:** Uses only 2½ bytes per word; add as many words as you wish.
- **FAST CORRECTING:** In as little as 30 seconds, Electric Webster can return you to your Word Processing program, with your text fully corrected and on your screen.
- **INTEGRATES:** with WordStar, DeskMate, Spellbinder, Volkswriter, Open Access, Allwrite, Newsprint, Lazy Writer, Superscriptsit, Scripsit, Electric Pencil, Copy Art, Powerscript, Zorlof, and LeScript (specify). Begins proofing at the stroke of a key; returns you to word processing automatically.



"The Cadillac"

of spelling checkers
80 Microcomputing, 9/82

VOTED #1: For the second straight year, Electric Webster was voted the #1 spelling checker in the *80 Micro* Reader's Choice Awards. (1/83, 1/84)

"The most helpful program I've found is Electric Webster. After looking at nine proofreading programs, I've settled on Webster . . ." *Creative Computing, 11/83*

This dictionary is not published by the original publishers of Webster's Dictionary or their successors.

ACCLAIMED:

"Electric Webster is the best. Just read any review in any magazine and I don't believe that you will find even one disagreement to that statement." *CINTUG, Cincinnati's Users Group Mag., 4/83*

"Now there's a program called Electric Webster that would let me write to Presidents and Kings and never feel embarrassed. Miss Mulberry would give Electric Webster an A+, and so will you." *Computer User, 1/84*

Performance "Excellent"; Documentation "Good"; Ease of Use "Excellent"; Error Handling "Excellent". *Info World, 8/82*

" ★ ★ ★ ★ ★ " *80 Micro, 3/85*

LOW PRICES:

TRS-80, Model I/III or IV	\$ 89.95
w/Correcting Feature	\$149.95
Hyphenation	\$ 49.95
Grammar & Style Checker	\$ 49.95

CP/M, PC/DOS or MODEL 1/2000	
Electric Webster, w/Correcting Feature, Hyphenation, and Grammar	\$199.95



**CORNUCOPIA
SOFTWARE**

(415) 524-8098
Post Office Box 6111 Albany, California 94706

May Your Well Never Run Dry

Welcome to *Spreadsheet Beat*, a forum for your template formulas and tips. It's a place where you can exchange information and pick up ideas for using your spreadsheet.

We count on you to write the column, so send us your ideas. We'll accept templates for any of the major commercial spreadsheets that run on Tandy computers.

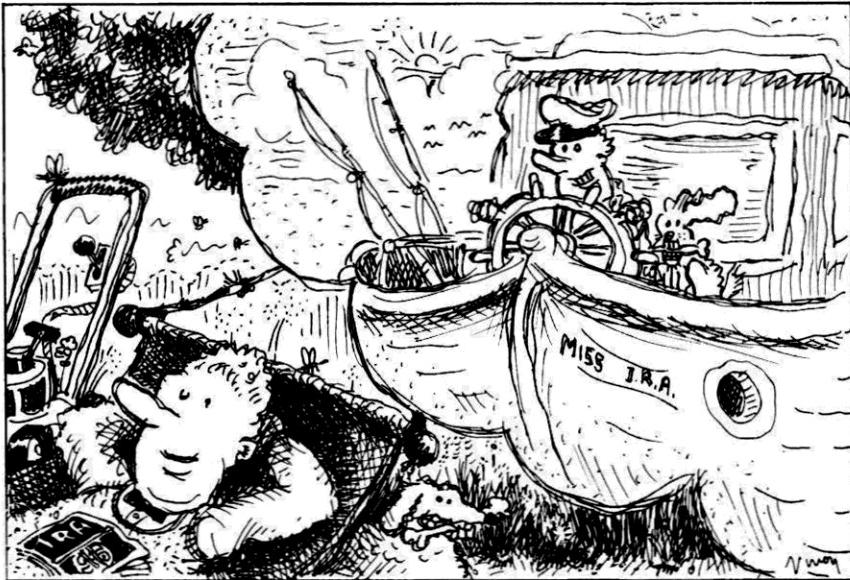
Submit your template to *Spreadsheet Beat*, 80 Micro, 80 Pine St., Peterborough, NH 03458. We'll pay \$50 for each one we publish. We'll also publish any valuable hints and patches you'd like to share.

by Russ Couey

Individual Retirement Accounts (IRAs) are a popular means of investment, but they exist in many forms. Among those available are speculative funds, fixed-rate money market funds, and bonds. These types of investments not only give you the opportunity to realize significant gains but also the potential to suffer substantial losses.

Before you decide on an investment, you may wonder how you would fare if you took a different route. By using my template formulas (see Fig. 1), you can analyze a potential investment and compare it to other types. In my example (Fig. 2), I invest in an ersatz speculative fund (ABC Growth Fund) and compare it to a more conservative money market fund with a fixed interest rate. You can also use the template to compare an investment you've already made with an alternative.

I designed my template for VisiCalc, but you can use it with any spreadsheet. Just change the cell labels and formatting commands to meet your spreadsheet's needs. The /F\$ part of my formulas formats results in dollars. Use whatever code is appropriate for your spreadsheet. When



Cell	Cell Formula
H14	/F\$ (F14 + G14)
F20	/F\$ (F18 * F19)
H20	/F\$ (F20 + G20)
F22	/F\$ (F18 - F15) * F19
F23	/F\$ (F15 * F19) - F14
F25	/F\$ (F22 + F23)
H25	/F\$ (F25 + G25)
F26	/F\$ (F25 / F14) * 100
H26	/F\$ (H25 / H14) * 100
F30	/F\$ (F19 - F29) / F29 * 100
H35	/F\$ (H34 - H33) / H33 * 100
F40	((F38 / 100) / 12 + 1) ^ (F39) * F14
H40	/F\$ (F40 + G40)
F41	/F\$ (F40 - F20)
H41	/F\$ (H40 - H20)
F42	/F\$ (F41 / F20) * 100
H42	/F\$ (H41 / H20) * 100
F44	/F\$ (F40 / F18)

Figure 1. Formulas for the VisiCalc template. The /F\$ characters format the cells for dollars. You have to use the command appropriate for your spreadsheet.

typing in the formulas, ignore the spaces; I only included them here for readability.

Column G (XYZ Growth Fund) lets you track an additional investment. I have not included formulas for that column, as they are identical to the formulas for column F. To use column G, copy the F cell formulas to the corresponding G line numbers with VisiCalc's Replicate-relative command. If you use a different spreadsheet, use the applicable Copy command.

My formulas analyze a speculative

investment that pays dividends in stock, not cash. The amount and value of the stock you own increases or decreases according to market trends. Your only cash outlay comes when you first buy the stock.

Template Format

Figure 2 shows my template's layout. The top section is for header information. The two investment columns (the ABC and XYZ Growth Fund columns) show example mutual fund-type growth stock investments.

SPREADSHEET BEAT

A	B	C	D	E	F	G	H	I
1								
2								
3	Filespec =	IRA:3						
4	Program =	Individual Retirement Account						
5	Data Date =	08-01-84						
6								
7								
8								
9								
10								
11	Inception to Date							
12	Purchase Date							
13	Account Number							
14	Investment \$	1000.00						
15	Shares Bought	126.582						
16	Share Price \$	7.90						
17								
18	Current Shares							
19	Current Price \$	132.838						
20	Current Value \$	10.00						
21								
22	Share Change \$	1328.38						
23	Price Change \$	62.56						
24								
25	Total Change \$	265.82						
26	Percent Change	32.84						
27								
28	Annual Fund Comparison							
29	January 1984 Value \$	9.37						
30	Percent Change	6.72						
31								
32	Standard & Poor's 500 Comparison							
33	January 1984 Value \$					164.04		
34	Current Value \$					162.35		
35	Percent Change					-1.03		
36								
37	Money Market Comparison							
38	Interest Rate	10.25						
39	Elapsed Months	30						
40	Current Value \$	1290.67						
41	Difference \$	1136.08						
42	Percent Gain/Loss	-37.71						
43		-2.84						
44	Break-Even Price	8.66						
45		2.22						
46								
47								

Figure 2. Sample layout of the template. You should customize it to suit your needs.

The section titled Inception to Date lists basic information about your annual IRA. Lines 12-16 define the initial purchase. Lines 18-20 reflect the status as of the current date (line 5). In line 18, you enter the number of shares you own according to your periodic mutual funds status report. In line 19, enter the current price as indicated in the mutual funds section of your newspaper.

Lines 22 and 23 indicate the amount

of change attributable to dividends (share increases) as opposed to market price changes. Lines 25 and 26 calculate the change in your investment's value from its value on the purchase date.

The third section of the template, Annual Fund Comparison, requires you to enter a price at the beginning of the current year (line 29). Line 30 then calculates a year-to-date percent change.

In the fourth section, Standard &

Poor's 500 Comparison, you must insert data at the beginning of the current year (line 33) as well as at each periodic update for current value (line 34). Line 35 calculates the percent change from the beginning of the year to the data date.

The fifth section, Money Market Comparison (lines 38-42), outlines a safe, conservative investment. Use this as a guideline in determining your relative financial gain or loss had you taken this investment route. Here, the "safe" investment is a money market fund with a long-term fixed interest rate.

For this example, I assumed an annual interest rate of 10.25 percent, the elapsed months are from the date of the IRA investments (line 12) to the data date (line 5), and interest is compounded monthly. Line 41 compares the money market's current value (line 40) with that of the growth investment (line 20). Here, the more conservative investment would have been better by \$52.81 (H41) or 2.22 percent (H42).

The sixth section, Break-Even Price, indicates what the share value of the growth fund would have to be to match the money market fund performance. Line 44 calculates this by using the data in line 18 (current shares) and line 40 (Money Market Comparison current value).

You can customize the template to include subsequent investments by using column inserts and modifying the totals column for the new sum. The Annual Fund Comparison and Standard and Poor's 500 Comparison are optional sections you can delete without affecting the template. ■

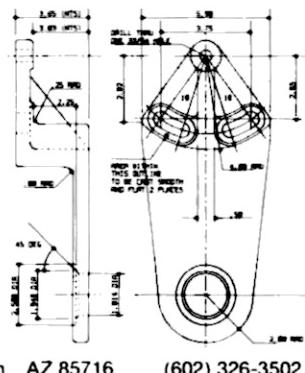
Write to Russ Couey at P.O. Box 6370, Fullerton, CA 92634.

COMPUTER ASSISTED DRAFTING

TCAD
CB MICRODEX

1212 N. Sawtelle

Tucson AZ 85716



(602) 326-3502

COMPUTER ASSISTED DRAFTING

PROFESSIONAL FEATURES

Plot up to 24" x 36"
Overlays, grids, zoom, pan
Copy, rotate, clip, merge
Reduce, enlarge
Text labels
more . . .

HARDWARE REQUIRED

Model III or 4/4P
High-res screen
Houston Instrument plotter

SOFTWARE ONLY \$ 449.95

Circle 299 on Reader Service card.

1212 N. Sawtelle Tucson AZ 85716

(602) 326-3502

TCAD
MICRODEX

SAVE A BUNDLE

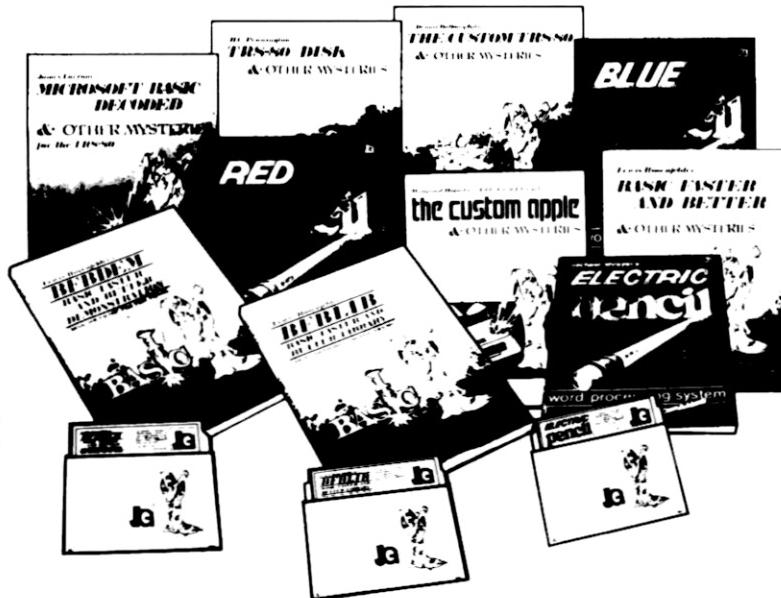
WITH ONE OF
OUR BUNDLES

We have put together special bundles of software just in time to save you a bundle of money. Didn't you ever wonder why CP/M was so popular? The reason is the software availability. All programs (except EP) are for the Model 4/4P and have been optimized to install and run without hassle. For example, we have memory-mapped WordStar® and it runs circles around the standard version available elsewhere. We also added printer drivers for the Daisywheel II and the DMP-2100. Our CP/M® 2.2 is the best around. Read the reviews. You *know* the programs. You *know* the prices. This is the years' best value. You owe it to yourself to let these CP/M® programs and thousands of others (many in the public domain) start serving your needs.



Save A Bundle on these books and disks

Take advantage of our volume discounts. Buy any three items from this list and deduct \$5 from your total order. Buy four...deduct \$10. Buy five...deduct \$15. Buy six...deduct \$20 and so on. Buy a bunch, save a bundle. Please add \$1 each for shipping. Add \$5 to orders under \$50 for handling.



*1984 by Montezuma Micro. WordStar®, SpellStar™, StarIndex™, MailMerge®, DataStar™, ReportStar™ and CalcStar™ belong to MicroPro® International Corporation. CP/M® belongs to Digital Research Inc. dBASE II® belongs to Ashton-Tate, Inc. All the Pencils™ belong to Michael Shrayer. Turbo Pascal™ belongs to Borland International.

TRS-80 Disk & Other Mysteries. The "How to" book of data recovery for the TRS-80 Model I disk operating system. 128 pages. Retail \$22.50

Now \$18

Microsoft BASIC Decoded & Other Mysteries. The complete guide to Level II and BASIC. 312 pages. Retail \$29.95

Now \$24

The Custom TRS-80 & Other Mysteries. The complete guide to customizing TRS-80 Hardware and Software. 336 pages. Retail \$29.95

Now \$24

BASIC Faster & Better & Other Mysteries. The complete guide to BASIC programming tricks and techniques. 290 pages. Retail \$29.95

Now \$24

BASIC Faster & Better Library Disk. Contains 121 functions, subroutines and user routines. Search merge, compare and listing routines plus array handlers, BASIC overlays and video drivers. Retail \$19.95

Now \$16

BASIC Faster & Better Demonstration Disk. Contains 32 demos of the Library Disk contents above. Retail \$19.95

Now \$24

BASIC Disk I/O Faster & Better & Other Mysteries. Programming tips and techniques to store/retrieve data from disk. 432 pages. Retail \$29.95

Now \$24

BASIC Disk I/O Faster & Better Demonstration Disk. All of the major demo programs and library of disk I/O subroutines in 25 BASIC programs. Random, Indexed Sequential and TREESAM file handlers included. Retail \$29.95

Now \$24

Machine Language Disk I/O & Other Mysteries. A guide to machine language disk I/O for the TRS-80. 288 pages. Retail \$29.95

Now \$24

TRSDOS 2.3 Decoded & Other Mysteries. Detailed explanation of the Model I disk operating system. 298 pages. Retail \$29.95

Now \$24

How To Do It On The TRS-80. A complete applications guide to the TRS-80 Model I, II, III, 100, and Color Computer. 352 pages. Retail \$29.95

Now \$24

The Custom Apple & Other Mysteries. Who cares? Retail \$29.95

Now \$19

Due to the nature of this business, there are **NO REFUNDS** on software. We accept American Express, MasterCard, Visa and COD. Your card is not charged until we ship your order. Personal and company checks are accepted without delay (call for details). Delivered prices are for the lower rightmost 48 States only. Prices and specifications subject to change without notice. If you don't understand any of this, just give us a call and we will take the time to explain it until you do. First-timers are always welcome here.

ORDER NOW . . . TOLL FREE

800-527-0347

800-442-1310

The Toll Free lines are for orders only.
Specifications subject to change without notice.



MONTEZUMA MICRO

214-339-5104
Redbird Airport, Hangar #8
P.O. Box 32027
Dallas, Texas 75232





MONTEZUMA MICRO

P.O. Box 2169
Camp Verde (Lizard Flats)
Arizona 86322

"WE KEEP YOU RUNNING"

COMPUTERS

25-1000	1dr Model 1000 128K RAM IBM Clone	\$ 1025
26-1069	2dr Model 1640 RS232C Pure Radio Shack	1099
26-1070	2dr Model 1640 RS232C Pure Radio Shack	899
26-3127	64K Extended BASIC Color Computer 2	179
26-3134	16K Color Computer 2	99
26-3136	16K Extended BASIC Color Computer 2	135
26-3589	Pocket Computer 3 with 4K RAM	85
26-3650	Pocket Computer 4	89
26-3801	Model 100 8K Portable Computer	59
26-3802	Model 100 24K Portable Computer	359
26-4004	Model 12 16 Drive	2199
26-5101	Model 100 2-drive, 128K	2124
26-5104	Model 100 2-drive, 128K & 256K	3398
26-6021	Model 6000 HD 512K	3824
26-6022	Model 6000 HD 512K	4674
26-6050	DT-1 Terminal	499
26-6052	DT-100 Terminal	675

MODEMS

25-1003	Model 1000 Int. Modem	153
26-1084	Model 4P Modem Board	\$ 127
26-1114	Modem 1000	169
26-1174	Acoustic Coupler Modem	127
26-1175	DC Modem 1B	85
26-1212	DC-2212 High Speed Modem	339
Anchor Mark 1 Modem	300 Baud with cable	74
Anchor 300/1200 Baud Modem with cable & PS	259	
Hayes Smartmodem 300 Baud	233	
Hayes Smartmodem 1200 Baud	525	

PERIPHERALS

LNW-80	2dr cabinet w/high drive	449
12" Green Non-Glare Video Monitor	79	
12" Amber Non-Glare Video Monitor	85	
Video cable for Model 1000 keyboard-to-monitor	7	
25-1010 Model 1000 128K Disk Controller	159	
25-1011 VM-3 Model 1200 Monochrome Monitor	159	
25-3040 Model 1200 Monochrome Adapter	169	
25-3043 Model 1200 Graphics Display Adapter	229	
25-3044 Model 1200 Techmar Graphics Master	229	
26-0511 Grounding Pad for Montezuma Anti-Glare Device	14	
26-0512 Grounding Pad for Montezuma Case	21	
26-1131 Model 1/34 SMB Hard Disk Secondary	1299	
26-1133 Model 3 15MB Hard Disk Inst. Kit	85	
26-1134 Model 4 128K Hard Disk Inst. Kit	68	
26-1183 Model 100 Bar Code Reader	85	
26-1185 Model 100 Bar Code Reader Pad	51	
26-1186 Mouse for Model 2000	85	
26-1196 Serial to Parallel Converter	85	
26-1208 CCR-81 Cassette Tape Recorder	31	
26-1209 CCR-82 Cassette Tape Recorder	42	
26-1209 CCR-82 Cassette Tape Recorder	2116	
26-1342 Clear Keypad for Model 3/4	111	
26-1410 Model 100 Modern Case	17	
26-1429 Automatic Power Strip/Surge Protector	59	
26-1451 Non-Automatic Power Strip/FILTER	42	
26-1461 Acoustic Coupler Model 3/4	42	
26-2206 Computer Diskette RS-32 Kit	69	
26-3007 Color Computer Carrying Case	17	
26-3008 Color Computer Joysticks, Pkg. Pair	21	
26-3012 Color Computer Deluxe Joystick/each	34	
26-3021 Color Computer 1/2 Disk Drive 1, 2 or 3	237	
26-3022 Color Computer 1/2 Disk Drive 1 or 2	237	
26-3025 Color Computer Mouse Interface	26	
26-3032 Color Computer Mouse	43	
26-3053 1 Cassette Interface	9	
26-3508 PC 1 Carrying Case	13	
26-3508 PC 2 Carrying Case	13	
26-3610 PC 3 Carrying Case	99	
26-3615 PC 2 4K RAM Module	59	
26-3616 PC 2 8K RAM Module	118	
26-3651 PC 4 Cassette Interface	33	
26-3653 PC 1K RAM Module	16	
26-3654 PC 1K RAM Module	16	
26-3804 Model 100 Adapter	6	
26-3805 Model 100 Acoustic Coupler	3	
26-3809 Model 100 Carrying Case	34	
26-3811 Model 100 Soft Carrying Case	42	
26-3814 Model 100 Large Bag	4	
26-3814 Model 100 Internal 15Mb Hard Disk Kit	2245	
26-4155 Model 23/12/16 15Mb Primary Hard Disk	1695	
26-4156 Model 2/3/12/16 15Mb Secondary Drive	1271	
26-4157 Model 2/12/16 Installation Kit for DWP-4155	297	
26-5111 Model 2000 VM 1 Monochrome Monitor	169	
26-5112 Model 2000 CM-1 Color Monitor	552	

FURNITURE

26-1305 Model 3/4 System Desk	\$ 152
26-1308 Universal Printer Stand	45
26-1324 Computer Table	68
26-1330 Computer Chair	42
26-1335 Newt Computer Stand	42
26-1336 System Desk	102
26-1357 Newt Printer Stand	85
26-1358 NEW! Computer for 1356/57 Desk/Stand	34
26-1359 NEW! Computer for 1356 Desk	51
26-1360 NEW! Printer Stand	25
26-4302 Deluxe System Desk	229
26-4305 Deluxe Printer Stand	126
26-4306 Terminal Stand	181
26-4307 Printer Stand	127
26-5113 Model 2000 Pedestal	76
26-5116 Model 2000 Floor Stand	123

PRINTERS & ACCESSORIES

26-1192 GGP-115 Color Graphics Printer	169
GT-116 Graphics Pad	90
DWP-410 Dotmatrix Printer	583
DWP-500 120cps Printer	1099
DWP-200 120cps Printer	424
DWP-200 120cps Dot-Matrix Printer	424
DWP-210 120cps Dot-Matrix Printer	509
DWP-210 120cps Dot-Matrix Printer	509
TP-10 Thermal Matrix Printer	85
TPG-220 Color Ink Jet Printer	594
26-269 PTC-64 64K Printer Controller (Buffer)	212
26-270 PTC-10 120cps Printer	1270
DWP-110 60cps Triple Mode Printer	339
DWP-210 120cps Triple Mode Printer	1695
NEW! TRP-100 Printer	255
26-1276 DMP-105 New Cheep Printer	169
26-1277 DMP-105 New Cheep Printer	169
26-1441 Bi-Directional Tractor for DWP-210	144
26-1447 Bi-Directional Tractor for DWP-210	144
26-1448 Single Bin Sheet Feeder for DWP-210	672
26-1449 DWP-210 120cps Printer	339
26-1450 Bi-Directional Tractor for DWP-410	65
26-1451 Model 1/3/4/5 Printer Cable	29
26-1408 RS-232C Cable	16
26-1409 Model 100 Printer Cable	13
26-1410 Model 12/16/2000 Printer Cable	29
26-1491 RS-232C Null Modem Adapter	25
26-1492 RS-232C Cable	33
26-1492 RS-232C Cable	46
26-1493 100' RS-232C Cable	76
26-1494 RS-232C Cable Extender	25
26-1495 RS-232C Null Modem Adapter	25
26-1496 SW-302 Parallel Printer Switch	102
26-1498 SW-302 Parallel Printer Switch	128
26-1591 PC 3 Printer	85
26-1605 PC 2 Printer	45
26-1655 PC 4 Printer	68

C.I.TOH

8520-350cps Parallel IBM Compatible	1995
8510BP 120cps Front-Tractor Parallel, IBM Comp.	\$ 149
8510BP Hot Dot, 120cps, Real Fast	495
8510SCP Color High Speed printer	549
1550P Prowriter 2, 120cps, for Wide Paper, Parallel	525
1550SP Hot Dot, 180cps, Real Fast & Wide	675
F10-14 Starwriter, 40cps Daisycycle	499
F10-14 Starwriter, 120cps, Real Fast	1099
F10 Bi-Directional Tractor with Plastic Cover	210
F10 Electric Single Bin Sheet Feeder Inst. Required	775
F10 Mechanical Single Bin Sheet Feeder	499
GX-100 Gorilla Banana, 50cps	139

We have dust covers for most every printer we sell. Be sure to order one with your new printer to keep it like new.

CABLES

manufacture a great number of different cable assemblies to connect most anything to anything else. Call us with your specific needs. We probably have it on the shelf. All at discount prices of course.

SUPPLIES

5.25" SSDD Diskettes, Pack of 10, 1 Year Guarantee \$ 15
5.25" DSDD Diskettes, Pack of 10, 1 Year Guarantee .19
8" SSD Diskettes, Pack of 10, 1 Year Guarantee .29
8" DSDD Diskettes, Pack of 10, 1 Year Guarantee .34
8" x 11" Tractor Paper 20lb, 2900 Sheets .25
8" x 11" Tractor Paper 20lb, 2900 Sheets .35
5.25" or 8" Head Cleaning Kit .9

RIBBONS

We have more ribbons than you do. Way too many types to list here. Add them to your order now. They're cheap too.

MONTEZUMA'S REVENGE

MODEL 3 UPGRADE 112K - CP/M - 80 COLUMN

This month Monty offers the deal of the year. The Holmes VBI-80 is the only plus in printed circuit board which expands the Mod 3 display to 24 lines of 80 characters and allows operation of the CP/M 2.2 operating system with a 56K TPAK. Both 80 x 24 and 64 x 16 modes are available from TRSDOS and BASIC. Reads and writes 18 different disk formats (Kaypro, Osborne, etc.). A total of 112K of RAM. The extra 48K RAM can be set up as a RAM disk through software routines that are furnished with the supplied CP/M 2.2. All you need to do is add the RAM and an 80 column monitor and you're up and running. It's so easy to follow installation instructions and operational documentation. No trace cuts or soldering required. Guaranteed for one year parts and labor. Monty can ship this today.

MONTE's SPECIAL PRICE \$ 279

Add WordStar 3.3 ready to run for \$ 100

"WE KEEP YOU RUNNING"

SOFTWARE

Note: It is Radio Shack policy that all major multiple computer software packages contain disks for all models. Optional disks are available at slight extra charge. Be sure to ask for details when you order.

NEW! CP/M 2.2 by Montezuma Micro For the Model 4 Rated best by actual test. Get the good one. \$ 169
NEW! CP/M Hard Disk Driver with Backup & Restore 30
26-0310 DR3000 For The Model 1 12
26-0311 DR3000 For The Model 3 12
26-0313 DR3000 6 Utility Disk 4
26-0315 DR3000 6 Utility Disk 34
26-0316 DR3000 6 Disk Doc Ref Card 34
26-0413 Disk Drive Analyzer Why pay more? 26-1507 Model 1/3 Cassette Spectator 51
26-1511 Model 3 Home Accountant 85
26-1512 Model 4 Target PlanCalc 85
26-1513 Model 1/3 Cass. Spectator 42
26-1514 Model 3 Profile Manager 169
26-1515 Model 3 W-Winter 106
26-1516 phs report for Model 3 85
26-1517 phs report for Model 4 85
26-1518 phs file for Model 4 107
26-1520 Model 4 VisCalc 85
26-1521 Model 4 Business Forecast 85
26-1527 Model 3/4 Formation 169
26-1530 Model 4 Multiplan 169
26-1532 Model 4 Multiplan 169
26-1533 Model 4 Apartment Management 255
26-1534 Model 4 Business Forecast 169
26-1535 Model 4 Business Forecast 169
26-1536 Model 4 Project Manager 85
26-1537 Model 4 Personnel Manager 85
26-1538 Model 4 Time Manager 85
26-1540 Model 4 Checkwriter 85
26-1541 Model 4 Mail Merge 85
26-1542 Model 4 Medical Office Systems 254
26-1543 Model 3 VisCalc Enhanced Version 85
26-1544 Model 3 SuperCalc 3 42
26-1545 Model 3 Accounts Receivable 169
26-1546 Model 3 Payroll 169
26-1547 Model 3 Accounts Payable 169
26-1548 Model 3 Inventory 169
26-1549 Model 3 Payroll 169
26-1550 Model 3/4 SuperCalc 3 42
26-1551 Model 3/4 SuperCalc 3 127
26-1552 Model 3/4 Accounts Receivable 169
26-1553 Model 3/4 Payroll 169
26-1554 Model 3/4 Accounts Payable 169
26-1555 Model 3/4 Inventory 169
26-1556 Model 3/4 Payroll 169
26-1557 Model 3/4 Accounts Payable 169
26-1558 Model 3/4 Project Manager 85
26-1559 Model 3/4 Personnel Manager 85
26-1560 Model 3/4 Time Manager 85
26-1561 Model 3/4 Checkwriter 85
26-1562 Model 3/4 Mail Merge 85
26-1563 Model 3/4 SuperCalc 3 14
26-1564 Model 3/4 Medical Office Systems 23
26-1565 Model 3/4 VisCalc Enhanced Version 14
26-1566 Model 3/4 SuperCalc 3 14
26-1567 Model 3/4 Business Forecast 42
26-1568 Model 3/4 Payroll 169
26-1569 Model 3/4 Accounts Payable 169
26-1570 Model 3/4 Project Manager 85
26-1571 Model 3/4 Personnel Manager 85
26-1572 Model 3/4 Time Manager 85
26-1573 Model 3/4 Checkwriter 85
26-1574 Model 3/4 Mail Merge 85
26-1575 Model 3/4 SuperCalc 3 14
26-1576 Model 3/4 Business Forecast 42
26-1577 Model 3/4 Payroll 169
26-1578 Model 3/4 Accounts Payable 169
26-1579 Model 3/4 Project Manager 85
26-1580 Model 3/4 Personnel Manager 85
26-1581 Model 3/4 Time Manager 85
26-1582 Model 3/4 Checkwriter 85
26-1583 Model 3/4 Mail Merge 85
26-1584 Model 3/4 SuperCalc 3 14
26-1585 Model 3/4 Business Forecast 42
26-1586 Model 3/4 Payroll 169
26-1587 Model 3/4 Accounts Payable 169
26-1588 Model 3/4 Project Manager 85
26-1589 Model 3/4 Personnel Manager 85
26-1590 Model 3/4 Time Manager 85
26-1591 Model 3/4 Checkwriter 85
26-1592 Model 3/4 Mail Merge 85
26-1593 Model 3/4 SuperCalc 3 14
26-1594 Model 3/4 Business Forecast 42
26-1595 Model 3/4 Payroll 169
26-1596 Model 3/4 Accounts Payable 169
26-1597 Model 3/4 Project Manager 85
26-1598 Model 3/4 Personnel Manager 85
26-1599 Model 3/4 Time Manager 85
26-1600 Model 3/4 Checkwriter 85
26-1601 Model 3/4 Mail Merge 85
26-1602 Model 3/4 SuperCalc 3 14
26-1603 Model 3/4 Business Forecast 42
26-1604 Model 3/4 Payroll 169
26-1605 Model 3/4 Accounts Payable 169
26-1606 Model 3/4 Project Manager 85
26-1607 Model 3/4 Personnel Manager 85
26-1608 Model 3/4 Time Manager 85
26-1609 Model 3/4 Checkwriter 85
26-1610 Model 3/4 Mail Merge 85
26-1611 Model 3/4 SuperCalc 3 14
26-1612 Model 3/4 Business Forecast 42
26-1613 Model 3/4 Payroll 169
26-1614 Model 3/4 Accounts Payable 169
26-1615 Model 3/4 Project Manager 85
26-1616 Model 3/4 Personnel Manager 85
26-1617 Model 3/4 Time Manager 85
26-1618 Model 3/4 Checkwriter 85
26-1619 Model 3/4 Mail Merge 85
26-1620 Model 3/4 SuperCalc 3 14
26-1621 Model 3/4 Business Forecast 42
26-1622 Model 3/4 Payroll 169
26-1623 Model 3/4 Accounts Payable 169
26-1624 Model 3/4 Project Manager 85
26-1625 Model 3/4 Personnel Manager 85
26-1626 Model 3/4 Time Manager 85
26-1627 Model 3/4 Checkwriter 85
26-1628 Model 3/4 Mail Merge 85
26-1629 Model 3/4 SuperCalc 3 14
26-1630 Model 3/4 Business Forecast 42
26-1631 Model 3/4 Payroll 169
26-1632 Model 3/4 Accounts Payable 169
26-1633 Model 3/4 Project Manager 85
26-1634 Model 3/4 Personnel Manager 85
26-1635 Model 3/4 Time Manager 85
26-1636 Model 3/4 Checkwriter 85
26-1637 Model 3/4 Mail Merge 85
26-1638 Model 3/4 SuperCalc 3 14
26-1639 Model 3/4 Business Forecast 42
26-1640 Model 3/4 Payroll 169
26-1641 Model 3/4 Accounts Payable 169
26-1642 Model 3/4 Project Manager 85
26-1643 Model 3/4 Personnel Manager 85
26-1644 Model 3/4 Time Manager 85
26-1645 Model 3/4 Checkwriter 85
26-1646 Model 3/4 Mail Merge 85
26-1647 Model 3/4 SuperCalc 3 14
26-1648 Model 3/4 Business Forecast 42
26-1649 Model 3/4 Payroll 169
26-1650 Model 3/4 Accounts Payable 169
26-1651 Model 3/4 Project Manager 85
26-1652 Model 3/4 Personnel Manager 85
26-1653 Model 3/4 Time Manager 85
26-1654 Model 3/4 Checkwriter 85
26-1655 Model 3/4 Mail Merge 85
26-1656 Model 3/4 SuperCalc 3 14
26-1657 Model 3/4 Business Forecast 42
26-1658 Model 3/4 Payroll 169
26-1659 Model 3/4 Accounts Payable 169
26-1660 Model 3/4 Project Manager 85
26-1661 Model 3/4 Personnel Manager 85
26-1662 Model 3/4 Time Manager 85
26-1663 Model 3/4 Checkwriter 85
26-1664 Model 3/4 Mail Merge 85
26-1665 Model 3/4 SuperCalc 3 14
26-1666 Model 3/4 Business Forecast 42
26-1667 Model 3/4 Payroll 169
26-1668 Model 3/4 Accounts Payable 169
26-1669 Model 3/4 Project Manager 85
26-1670 Model 3/4 Personnel Manager 85
26-1671 Model 3/4 Time Manager 85
26-1672 Model 3/4 Checkwriter 85
26-1673 Model 3/4 Mail Merge 85
26-1674 Model 3/4 SuperCalc 3 14
26-1675 Model 3/4 Business Forecast 42
26-1676 Model 3/4 Payroll 169
26-1677 Model 3/4 Accounts Payable 169
26-1678 Model 3/4 Project Manager 85
26-1679 Model 3/4 Personnel Manager 85
26-1680 Model 3/4 Time Manager 85
26-1681 Model 3/4 Checkwriter 85
26-1682 Model 3/4 Mail Merge 85
26-1683 Model 3/4 SuperCalc 3 14
26-1684 Model 3/4 Business Forecast 42
26-1685 Model 3/4 Payroll 169
26-1686 Model 3/4 Accounts Payable 169
26-1687 Model 3/4 Project Manager 85
26-1688 Model 3/4 Personnel Manager 85
26-1689 Model 3/4 Time Manager 85
26-1690 Model 3/4 Checkwriter 85
26-1691 Model 3/4 Mail Merge 85
26-1692 Model 3/4 SuperCalc 3 14
26-1693 Model 3/4 Business Forecast 42
26-1694 Model 3/4 Payroll 169
26-1695 Model 3/4 Accounts Payable 169
26-1696 Model 3/4 Project Manager 85
26-1697 Model 3/4 Personnel Manager 85
26-1698 Model 3/4

Maxell Floppy Disks

The Mini-Disks
with maximum quality.



Dealer inquiries
invited. C.O.D.'s
accepted. Call
FREE (800) 235-4137.



PACIFIC EXCHANGES
100 Foothill Blvd., San Luis
San Luis Obispo, CA 93401
In Cal. call (800) 592-5935 or
(805) 543-1037.

Circle 422 on Reader Service card.

Word Processing SIMPLIFIED

for
Super SCRIPSIT
**The simple
instruction book**

use with TRS-80 III, IV, IVP
CLEAR, SIMPLE, EASY

- home • office • education
- All you need is a super SCRIPSIT diskette.

The **only** instruction book
you'll ever need.

ORDER NOW

Send check or MO for \$16.95
includes shipping to:

Kelly Enterprises
P.O. Box 247
Holt, MI
48842-0247

Circle 317 on Reader Service card.

NEW Genealogy Program

(For 48K Model III/4/4P Two Disk Systems)

HOLDS 350 RECORDS PER FILE

- ★ Easy to Use ★ Help Menus
- ★ Screen Oriented

**Fast Sorts, Good Documentation,
Outstanding Program for the Price**

Five Reports: Full Alpha Printout,
Family Tree, Paternal Line, Maternal
Line, Descendent Line **\$49.95**

Accept Visa, MasterCard, Check or Money Order

MIMAR, INC.

601-388-8033

116 Baywood Drive : Biloxi, MS 39532

Free Shipping For U.S. Orders
Mississippi Residents add 6% Sales Tax

REVIEWS

Continued from p. 36.

board into a Dvorak-style keyboard by translating all input keys, the other you can use either in an output filter connected to the printer or the RS-232 port, or to translate ASCII values to EBCDIC, the standard used on IBM mainframes.

RDTEST/CMD

RDTEST will read all the sectors on a disk and report any read errors it finds. It's valuable if you want to check the quality of a disk that has information on it; RDTEST doesn't destroy or reformat the disk at all. It sends reports of flawed sectors to either the screen or a printer, and you can specify the number of times you want it to read through the entire disk.

TYPEIN/CMD

The last program on the LS-Utilities disk is an enhancement of the TRSDOS 6.X job control language (JCL) called TYPEIN/CMD. TYPEIN offers two advantages and two drawbacks compared to JCL.

The first advantage is that TYPEIN can send characters to programs that scan the keyboard (using the @KEY SVC) to look for single-key responses. Basic programs often use INKEY\$ or INPUT\$ to get a single keystroke as a menu selection. The TRSDOS JCL program is incapable of sending responses to such programs, but TYPEIN can.

TYPEIN's second advantage is that it can take its input either from a file or directly from the keyboard. You may know what you want a program to do and how it should respond to several prompts, but perhaps you don't use it that often. Or, you may answer the prompts differently each time you run a program. With TYPEIN, you can enter each command that you want to run automatically at the beginning of a session, in much the same way that you'd build a JCL file. However, LS-Utility doesn't save the list of automatic commands to disk.

TYPEIN's biggest disadvantage compared to JCL is that it can only process keystrokes. It can't handle any of the JCL macros such as //IF. Therefore, you can't access the full capabilities of the TRSDOS job control language with TYPEIN.

Secondly, TYPEIN won't work with programs that scan the keyboard

looking for abort keys only, such as the break and clear keys. Each such scan drains and discards keystrokes in the type-ahead buffer and also drains and discards all keystrokes in TYPEIN's buffer or disk file. Because of TRSDOS's structure, you can't get around such a problem.

The Docs

The 22 pages of loose-leaf documentation is terse, but adequate to explain how to use each of the utilities (except in the case of the READ40/CMD drive table mentioned).

Conclusion

It is unlikely that most Model 4/4P owners will use all eight utilities. That doesn't detract from its value, however. If you have a use for only one or two of these programs, you should find that LS-Utility is well worth its price. If you need more than one utility, it's an excellent buy. ■

The Price is Right

by John B. Harrell III

★★★☆

EasyWriter 1 System runs on the Tandy 2000, 1200, 1000 (128K) and on IBM PC compatibles. It requires one disk drive and either a monochrome or color monitor. Information Unlimited Software, 2401 Marinship Way, Sausalito, CA 94965-9987. \$195.

Easy to use: ★★★★★

Good docs: ★★★★★

Bug free: ★★★★★

Does the job: ★★★★★

★★★☆

Volkswriter Deluxe 2.0 runs on the Tandy 2000, 1200, 1000 (256K) and on IBM PC compatibles. It requires one disk drive and either a monochrome or color monitor. Lifetree Software Inc., 411 Pacific Street, Monterey, CA 93940. 408-373-4718. \$295.

Easy to use: ★★★★★

Good docs: ★★★★★

Bug free: ★★★★★

Does the job: ★★★★★

People most often use computers in word processing. But it's not easy to find a word processor that suits both your needs and your pocketbook. EasyWriter and Volkswriter Deluxe are two well done, modestly priced word processors that provide most of the text manipulation functions you'll need.

REVIEWS

EasyWriter I System

EasyWriter readily supplies all the basics for almost any word processing application. With its low cost (\$195) and ease of operation, it's perfect for users just beginning to work with their computers.

The EasyWriter package comprises three interfaces: the file manipulation menu, the editor, and the print menu. You select each of these options with the function keys; when you first boot up the system, however, you're in the file manipulation menu. Here you can invoke the standard file functions: delete, rename, load, store, and so on.

EasyWriter also lets you specify a file mask to selectively display certain files. For example, the mask C:DAT* pulls all files from drive C that begin with the letters DAT. But you can't specify a file extension or a path name as part of the mask.

The Editor

EasyWriter's file editor resembles my old friend WordStar. Special print effects require symbols on the screen and don't use the computer's hardware for bold and underlined text. The files indicate soft spaces for justification and other special features with special characters.

EasyWriter includes some nice features, like an undelete function that takes care of any finger slips you might make. The ability to tell the computer "Whoops!" as you learn is particularly important.

The Printer

Also vital is good printer support. EasyWriter shines in this area, supporting 37 printers, including definition files for all of the Tandy printers. (EasyWriter comes installed for the Radio Shack DWP-410 printer.)

The printer menu lets you produce multiple copies of a file or print only part of a file. You can use continuous forms or single sheets of paper.

You can link files together, too, to print out a document that spans more than one file (and even more than one disk). Also, you can preview a document prior to printing it out to check on the format.

The Speller

To me, the best part of EasyWriter is its spelling checker. The checker comes with an 80,000-word dictionary

that handles words up to 29 characters long. You can check linked files as well, and the checker retains words you've identified as satisfactory.

For those of you who can't spell, a spelling checker alone sometimes isn't enough; you have to know how to spell the flagged words to enter them in the dictionary. The words that confuse me are those close to the correct spelling. EasyWriter solves this problem by using a phonetic substitution analyzer to recommend candidates for replacing an erroneous word.

EasyWriter also contains a sophisticated MailMerge function that lets you print customized documents for mass mailing. In addition, you can produce form letters or insert boilerplate text with this module.

Deficiencies

Some items I don't like. First of all, EasyWriter works only in black and white and doesn't compensate for the video bug in MS-DOS Version 02.00.XX, which incorrectly handles the intensity of the characters. Because of this defect, EasyWriter displays text in bright white letters against a black screen (on a color monitor).

EasyWriter limits the directory display to only those files it can access. You must exit to MS-DOS to see the entire directory or to determine the space remaining on a disk. The limitation on path name support under MS-DOS is an unreasonable restriction.

I experienced trouble with both of the Okidata printer files. Someone might have installed them who glanced through a list of control codes and didn't read the printers' supporting text. Nevertheless, several features were inoperative on my Okidata and I couldn't get it to print bold using the enhanced/emphasized modes because I didn't have enough bytes available to install the proper codes. I couldn't check out any of the daisy wheel printers and no mention is made in the text for support of proportionally spaced printing.

Volkswriter Deluxe 2.0

I have to rate Volkswriter Deluxe the Cadillac of small word processors. It has many of the features of higher-priced word processors and I found it easy to use once installed.

Circle 427 on Reader Service card.

JOIN THE FORTH REVOLUTION

Discover the flexibility and power of FORTH programming!

You'll find your development time is shortened, programs run faster and memory requirements are drastically reduced. FORTH is the language of tomorrow and it's available today from SOTA Computing Systems Limited.

With truly impressive benchmark timings • a library of over 300 predefined FORTH words • and running in less than 8K • this is the state-of-the-art FORTH implementation you have been waiting for!

\$75.00 Gives you the introductory programmer's guide, the comprehensive reference manual, and FORTH disk. The diskette contains the standard core vocabulary, an editor, an assembler (with true Z-80 mnemonics) and a FORTH operating system (which like FORTH itself is simple to use and easy to master). In addition to the FORTH definitions required by the standard, we've included over 50 extra commands that you'll find particularly useful. We've even provided a way for you to distribute your own programs without incurring expensive and awkward licensing arrangements. What's more, figFORTH from SOTA is totally compatible with TRSDOS™, LDOS™, NEWDOS™ and CP/M Plus™.

ORDER FORM	
General: I want to join the FORTH revolution <input type="checkbox"/> Enclosed is my <input type="checkbox"/> check <input type="checkbox"/> money-order for \$75.00 (US Funds)	<input type="checkbox"/> Bill my <input type="checkbox"/> VISA <input type="checkbox"/> Mastercard I have indicated my card number and expiry date below Please rush me my copy of figFORTH by SOTA for the TRSDOS™ computer I have indicated I understand you guarantee to ship my order within 24 hours of receipt, so let's get with it! <input type="checkbox"/> Model I <input type="checkbox"/> Model III <input type="checkbox"/> Model 4/4P
NAME: _____	STREET: _____
STATE: _____	ZIP: _____
CARD TYPE: _____	EXP/DATE: _____
CARD NO.: _____	
SIGNATURE: _____	

ORDER TODAY 213-1080 Broughton Street
Vancouver, British Columbia
Canada V6G 2B8

ORDER BY MAIL OR BY PHONE: (604) 688-5009



*TRSDOS, LDOS, NEWDOS and CP/M Plus are registered trademarks of Radio Shack, Logical Systems Inc., Apparec Inc. and Digital Research respectively.
TRS-80 is a registered trademark of Radio Shack

80 micro's List of Advertisers

Reader Service Number	Page	Reader Service Number	Page	Reader Service Number	Page
374 ALPS	61	9 H & E Computronics	CIV, 30	206 Powersoft	28
82 Aerocomp	90, 91	9 H & E Computronics	121	306 Powersoft	51
215 Alcor	CIII	405 H.F. Signalling	113	406 Powersoft	37
136 Allen Geller Software	72	355 H.D.P.	105	384 Practical Software	45
476 Alpha Bit Communications	123	455 Hard Drive Specialists	97	249 Press A Software	104
17 Alpha Products	13, 15, 21	175 Howe Software	25	76 Producer, The	16
30 Allwrite	10	46 Hypersoft	28	449 Professor Jones/Frogg	
141 Anitek Software Products	23	101 J & M Systems	7	House	37
383 Astro-Star	89	126 JMG Software International	2, 3	248 Programmers & Assoc.	51
270 Avanti Associates	47			30 Prosoft	11
152 BC Compco	112	534 Jameco Electronics	47	75 Radio Shack/Tandy	CII, 1
381 Bodex	66	485 Kalglo	67	368 Safeware	127
388 Business Utility Software	119	422 Kelly Enterprises	110	* Software Support	68, 69
299 C.B. Microdex	107	235 LSR Learning Associates	89	427 Sota Computing Systems Ltd.	
86 Compulogic	122	210 Lambda	115		111
133 Computer Discount of America	122	* Langly-St. Clair	61	213 Standard Software	124
		251 Logical Systems Inc.	18, 19	71 Sublogic Communications	
357 Computer Friends	67	2 Longview	4		98
18 Computer Plus	73, 85	250 Marymac	53	150 Summit Software Tech	66
* Corporate Microsystems	75	* Micro Data Supplies	76, 77	456 Sunlock Systems	119
282 DFW Computer Center	45, 89	464 Micro Labs	127	285 Sun Research	88
27 Design Software	37	230 Micro Roots	104	347 Talley Communications	115
367 Digital Images	113	137 Miller Microcomputer	113	81 Total Access	26
204 Diskount Data	79	317 Miram	110	227 Trisoft	126
91 Dotwriter	9	107 Misosys Inc.	53	211 TSoft	113
231 Dowling	113	411 Montezuma Micro	56, 57	* Vespa Computers	117
216 EAP Company	124	416 Montezuma Micro	108, 109	123 Wilson Technical Service	117
85 Educational Micro Systems		* New Classic	89	279 Zygotron	113
		281 Nibble Notch	45		
80 Micro		468 Nibble Notch	125		
CW Communications, Inc.	87	232 Nocona Electronics	101		
Load 80 Subscription	64	36 Omnisoft Research	61		
Subscription	32	151 Orion Instruments	125		
Subscription Problem	113	207 Pacific Exchange	104, 110		
45 Electric Webster	105	200 Pacific Software			
350 EnFleur Corp.	119	Consultants	53		
252 Engineering Programming	115	124 Perry Computers	38, 39		
258 E-Soft	51	176 Personal Computer	105		
214 Fort Worth Computers	29, 99	440 Personal Integrated Computers			
103 Good Software	117				
496 Good Software	119	290 Pickles & Trout	95		

For further information from our advertisers,
please use the Reader Service card.

*This advertiser prefers to be contacted directly.

Advertising Sales (603) 924-7138

or (800) 441-4403

West Coast Sales (415) 328-3470

Circle 152 on Reader Service card.

NEW PRINTERS ADDED! FIND YOURS BELOW.

Good This Month

RADIO SHACK • CENTRONICS • COMMODORE • EPSON • ANADEX • BASE 2 • IBM • NEC • C. ITOH • DEC • OKIDATA • OTHERS

RIBBON SALE

EXACT REPLACEMENTS

PRINTER MAKE, MODEL NUMBER (Contact us if your printer is not listed. We can probably RELOAD your old cartridges.)	RIBBON SIZE Inches by Yards	INSERTS EZ-LOAD™ DROP IN NO WINDING! EXACT REPLACEMENTS made in our own shop cartridges not included	RELOADS You SEND your used CARTRIDGES to us. We put OUR NEW INSERTS in them	NEW CARTRIDGES (from the various manufacturers Subject to availability *)	SILVER DOLLAR WIN to LOAD WHY DO WE SELL THESE? This is the type ribbon you get if you order from our fel- low advertisers. We sell them for less since we make them ourselves. Do you really like the mess and inconvenience of unwinding and dumping this type ribbon into a waste basket or out on a newspaper and/or winding it into your cartridge? We don't know why these are being sold. Com- puters should simplify your life, not make it more com- plex just to save a few pen- nies. You are welcome to order these if you cannot af- ford our EZ LOAD™ IN- SERTS, RELOADS, or NEW CARTRIDGES BUT BEWARE! You now know how to avoid disappointment. One more caution: be sure to check the length of any ribbon BEFORE you buy it. For instance, an MX-100 ribbon should be 30 yards long, not 20 as in the MX-80.
BASE 2 - DIP 81/82/84/85 - MPI 88/99/GX	1/2x20	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$20/2 \$57/6 \$ 99/12	
CITOH Prowriter 1550/8510 - NEC 8023/8025	1/2x18	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$15/2 \$42/6 \$ 78/12	
CITOH Starwriter F10/CARBON FILM BLACK DIABLO HYTYPE II X FABRIC BLACK	5/16 5/16x17	\$24/6 \$42/12 \$234/72 \$21/3 \$78/12 \$510/72	\$5 ea 3-11 \$4 ea 12 or more \$8/1 \$7 ea 2 or more	\$18/3 \$60/12 \$348/72 \$18/2 \$51/6 \$ 96/12	
OKIDATA-PACEMARK 2350-2410 Black -MICROLINE ML80/82/83/93	1/2x100	\$36/3 \$132/12 \$720/72	\$20/1 \$18 ea 2 or more		\$32 Each
RADIO SHACK - MICROLINE ML84	1/2x40				Spool \$39/12
CARBON FILM - DWP-210 Black (1445)	5/16x145	\$24/6 \$42/12 \$234/72	\$5 ea 3-11 \$4 ea 12 or more	\$18/3 \$60/12 \$348/72	Spool \$ 84/12
DAISY WII-DWP-410-510 Black (1419)	1/4x145	\$24/6 \$42/12 \$234/72	\$5 ea 3-11 \$4 ea 12 or more	\$18/3 \$60/12 \$348/72	
Red, Green, Blue, Brown Colors (1419)	1/4x130	\$30/6 \$54/12 \$288/72	\$6 ea 3-11 \$55 ea 12 or more	\$21/3 \$72/12 \$420/72	
FABRIC (Long-Life) DWP-210 Black (1458)	5/16x17	\$21/3 \$78/12 \$510/72	\$8/1 \$7 ea 2 or more	\$18/2 \$51/6 \$ 96/12	
DAISY WII-DWP-410/510 Black (1449)	Not Ez Load 1/4x25	\$21/3 \$78/12 \$510/72	\$8/1 \$7 ea 2 or more	\$18/2 \$51/6 \$ 96/12	
LPI-II-IV CENTRONICS 730/737/739/779 (1413)	9/16x16	\$12/3 \$45/12 \$252/72			
DMP-200,120,430 (1296) (1483)	1/2x20	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$27/2 \$81/6 \$162/12	
DMP-500 (1482)	1/2x20	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$24/2 \$72/6 \$144/12	
DMP-2100 - TOSHIBA P1340,1350,51 (1442)	1/2x20	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$15/2 \$42/6 \$ 78/12	
DMP-100, LP VII-Commodore 1525, Gorilla Banana (1424)	Inker Loop			\$16/2 \$48/6 \$ 96/12	
LP III-V (1414)	1/2x15	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$15/2 \$42/6 \$ 78/12	\$12/3 \$44/12 \$252/72
DMP-400/420, LP VI-VIII (1418)	5/16x14	\$15/3 \$54/12 \$288/72	\$7/1 \$6 ea 2 or more	\$15/2 \$42/6 \$ 78/12	\$11/3 \$40/12 \$228/72
EPSON-LQ 1500 -MX/FX/RX 70/80 - IBM PC -MX/FX/RX 100 - IBM PC	1/2x14 1/2x20 1/2x30	\$15/3 \$54/12 \$288/72 \$18/3 \$66/12 \$360/72	\$7/1 \$6 ea 2 or more \$8/1 \$7 ea 2 or more	\$22/2 \$63/6 \$120/12 \$14/2 \$36/6 \$ 66/12	\$12/3 \$44/12 \$252/72 \$18/2 \$51/6 \$ 96/12 \$15/3 \$54/12 \$288/72
COMMODORE 8023-P - CENTRONICS 152-2 ANADEX 9000 Series	1/2x12 1/2x30	\$15/3 \$54/12 \$288/72 \$18/3 \$66/12 \$360/72	\$7/1 \$6 ea 2 or more \$8/1 \$7 ea 2 or more		SEND CHECK, MONEY ORDER, OR C.O.D. (\$3.00 TO: BCCOMP VISA MasterCard

WORRIED ABOUT ORDERING BY MAIL? Relax. We've been in business for many years and can please the smallest and largest accounts. You receive some of the finest ribbons available made of our own exclusive IMAGE PLUS +™ fabric and carbon film. Our ribbons fit your printer exactly. COMPARE, but BEWARE! We order all our competitor's products and are amazed at what we get. We use the latest state-of-the-art production equipment and are blessed with a fine, dedicated staff. We guarantee everything we make. period. Our ribbons are made fresh daily and our goal is to ship your order within 24 hours. Write for our brochure and price list.

Prices subject to change without notice.

BCCOMP
President

SEND CHECK, MONEY ORDER, OR C.O.D. (\$3.00 TO:

BCCOMP
800 South 17 Box 246
SUMMERSVILLE, MO 65571
(417) 932-4196

WE PAY UPS SHIPPING on PREPAID ORDERS
PLEASE INCLUDE STREET ADDRESS for UPS DELIVERY
FOREIGN ADD 15% U.S. FUNDS

Circle 367 on Reader Service card.

NEW! Lower Prices!!

wabash®

six-year warranted
DISKETTES!
\$11.90/box (10)

5 1/4" single-side, single-density; double-density add \$2/box. Add \$3 per order shipping. In Illinois add 7% sales tax.

Library Case-\$1.50 (with disk purchase)
Immediate shipment on VISA, MasterCard or Money order; add 14 days for personal checks.

CALL TOLL FREE
(800) 222-1248

In Illinois Call (312) 882-8315

DEALERS! SCHOOLS! USER GROUPS!
Call for our volume discount prices!

DIGITAL IMAGES
1185 Tower, Schaumburg IL 60195

Circle 211 on Reader Service card.

HIDRAW
MODEL 4
SOFT

COMPUTER-AIDED DRAWING program for the TRS-80 Model 4/4P with High Resolution Graphics Board.

- Draw to any scale set by user.
- Easy to see cross-hair cursor.
- Draw Boxes, Lines, Circles, Arcs.
- Paint automatically 26 different styles.
- Paint with 8 brush sizes.
- Type text in 4 directions.
- Draw at any angle, specify length.
- Line styles.
- Use grid coordinates to move or draw.
- Help menu.
- Much more.

Required equipment: 64K Model 4/4P with RADIO SHACK High Resolution Graphics Board and 2 drives. (Printer optional). Please include SASE with all inquiries.

HIDRAW.....\$49.95

To ORDER: Send check or money order. (PA. residents please add 6% sales tax.) Add \$2.00 for postage and handling.

T. Soft
R.D. #5, Box 120
Kittanning, PA 16201
Radio Shack and TRS-80 are trademarks of Tandy Corp.

Subscription Problems?

80 Micro does not keep subscription records on the premises, therefore calling us only adds time and doesn't solve the problem.

Please send a description of the problem and your most recent address label to:

80Micro

Subscription Dept.

PO Box 981

Farmingdale, NY 11737

Thank you and enjoy your subscription.

Circle 279 on Reader Service card.

PRINTER OWNERS

Letters are received here on a regular basis from customers saying how much they really enjoy receiving our lists.

It's probably safe to say that the price lists issued here are different from most of the others. Maybe it's the chatty folksy style of writing? Perhaps it's the low, almost unbelievable, prices on printer cartridges? Again, it could be dealing with a dealer that understands the hobby Computer user and really cares about what you think?

Send your name and address today for a rather fat envelope of printer and computer related offers.

ZYGOTRON

P.O. Box 27
Fremont, Michigan 49412

Circle 231 on Reader Service card.

UTILITY PROGRAMS FOR MODEL I

BSH—BASIC SCREEN Handler allows the user to format and save full screens to be used by a BASIC program. Variables are defined to be alphanumeric or numeric, to be input only, output only, or input/output.

CFP—Command File Processor allows the user to save a series of commands in a file, and have those commands processed later as if they were being entered by hand.

PATCH—is a program designed for the assembler programmer to alter OBJECT code (CMD or CIM files), without having to reassemble and link the source code.

DICOPY—is a file copier for users with only one disk drive on their computer system.

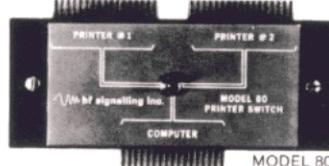
BSH	\$35.00
CFP	\$25.00
PATCH	\$15.00
DICOPY	\$15.00

TO ORDER: Send check or money order along with your choice of program. Shipping and handling are included. (New York residents please add appropriate sales tax.)

Dowling Enterprises, Inc.
P.O. Box 12726
Albany, NY 12212-2726
(518) 459-2713

Circle 405 on Reader Service card.

PRINTER SWITCH SALE



2-PINTERS ON-LINE

Model 80 Line Printer Switch. Parallel printer port switch used to select between 2 printers and 1 computer. For Models I, III, IV, IVP, 1000, 1200, 2000

Reg \$66.50 \$57.

2-COMPUTERS ON-LINE

Model 82 Line Printer Switch. Parallel printer port switch used to select between 1 printer and 2 computers.

Switches are for use with TRS-80 computers but are adaptable to any Centronics-type parallel interface. Provides card-edge connection.

Reg \$120 \$90. 2 cables included

CABLES—Choose from a wide selection of 6 ft. in-stock cables for all models or we'll make what you need. Prices start at \$19.

hf signalling inc.

3121 F S Dodgion Street
Independence, MO 64055



(816) 833-4448

Circle 137 on Reader Service card.

FOR TRS-80 MODELS 1, 3 & 4 IBM PC, XT, AND COMPAQ

Train Your Computer to be an EXPERT!

Expert systems facilitate the reduction of human expertise to simple, English-style rule-sets, then use them to diagnose problems. "Knowledge engineers" are developing many applications now.

EXPERT-2, Jack Park's outstanding introduction to expert systems, has been modified by MMS for MMSFORTH V2.0 and up. We supply it with full and well-documented source code to permit addition of advanced features, a good manual and sample rule-sets: stock market analysis, a digital fault analyzer, and the Animal Game. Plus the benefits of MMSFORTH's excellent full-screen editor, super-fast compiling, compact and high-speed run-time code, many built-in utilities and wide choice of other application programs.

(Rule 1 - demo in EXPERT-2)

IF you want EXPERT-2
AND NOT you own MMSFORTH
THEN HYP you need to buy

MMSFORTH plus EXPERT-2
BECAUSE MMSFORTH is required

EXPERT-2

in

mmsFORTH

The total software environment for IBM PC, TRS-80 Model 1, 3, 4 and close friends.

• Personal License (required):

MMSFORTH System Disk (IBM PC)	.....	\$249.95
MMSFORTH System Disk (TRS-80 1, 3 or 4)	.....	129.95

• Personal License (optional modules):

FORTHCOM communications module	.....	\$39.95
UTILITIES	.....	39.95
GAMES	.....	39.95
EXPERT-2 expert system	.....	69.95
DATAHANDLER	.....	59.95
DATAHANDLER-PLUS (PC Only, 128K req.)	.....	99.95
FORTHWRITE word processor	.....	175.00

• Corporate Site License

Extensions from \$1,000

• Some recommended Forth books:

UNDERSTANDING FORTH (overview)	....	\$ 2.95
STARTING FORTH (programming)	....	18.95
THINKING FORTH (technique)	....	15.95
BEGINNING FORTH (w/ MMSFORTH)	....	16.95

Shipping/handling & tax extra. No returns on software.

Ask your dealer to show you the world of MMSFORTH, or request our free brochure.

MILLER MICROCOMPUTER SERVICES
61 Lake Shore Road, Natick, MA 01760
(617) 653-6136

The operation of formatting and transferring a system to your working disks is a necessary chore and generally doesn't take too long. The configuration program supplied with this version should be thrown away, however: I spent 90 minutes on a 10-minute job because every time I used the escape or arrow keys, the program hung up, requiring a system reset. This was unsatisfactory in a beginner's system.

Once I got past this stumbling block, I fell in love with Volkswriter Deluxe. It's really simple to use and makes magnificent use of the Tandy 2000's colors to display the special attributes of the printer code and page layout.

Solid Functions

Unlike EasyWriter, Volkswriter takes full advantage of MS-DOS 2.0's features. You can use full path names to access any subdirectory and you can print text to disk to allow background printing of a document (or several documents) using the DOS Print command.

Volkswriter manipulates files that are essentially ASCII text files. In fact, if you use no special printing enhancements, you can integrate the files in any application. Volkswriter can also process any text file output from other programs, such as dBASE II or Supercalc. Lifetree even includes a utility to convert WordStar files to Volkswriter format.

Volkswriter supports the entire line of Radio Shack printers, including the CGP-220 Color Ink Jet printer. While it doesn't support any of the popular printers (including Epson or Okidata models), installing your own printer codes is easy and requires only about 10 minutes.

Volkswriter also supports keyboard translation tables. You can customize your keyboard to support foreign languages or math symbols, and you can apply these commands to printer translation tables. The table can translate a single-byte code into multiple bytes, so you can generate extended characters.

Another outstanding feature is Volkswriter's ability to create a file larger than your memory size. You can write files up to 1 megabyte in size if you have the disk capacity. Volkswriter uses a memory-demand paging algorithm where the least recently used page is the first to be spilled to the disk

if you need more space. This provides maximum efficiency while you edit.

Deficiencies

Volkswriter isn't without its faults. First of all, it doesn't run properly in color under the older MS-DOS; you'll need version 2.11 to allow adequate screen update. Second, Lifetree has modified Volkswriter's black and white characteristics to accommodate the defective BIOS in earlier versions. Running the black and white version under MS-DOS 2.11 hurts your eyes, because the high and low intensities are reversed! And the cursor leaves white blotches all over the screen when operating in the color mode.

The use of the soft keys was poor. I'm accustomed to having the more frequently used functions on the shifted and unshifted keys where I can get at them with a one- or two-hand manipulation. Some of the more frequent operations require using the alternate or control keys, forcing a touch typist into an abnormal series of keystrokes.

My biggest complaint with Volkswriter is the documentation. While Volkswriter presents all the proper details, it doesn't have photos showing computer-generated responses. There isn't a picture or drawing included. Further, the organization is poor, making it difficult to find information. I don't want to be forced into a lengthy search of the manual when I'm in the middle of a document.

While Volkswriter doesn't contain a spelling checker, its files lend themselves easily to many commercially supplied spelling checkers.

Conclusion

It's impossible to satisfy everybody with one software package, because needs vary according to your skills and how you use the software. These two packages provide economical word processor systems. Each one has advantages and disadvantages. If your needs are minimal and your budget is limited, you can do no better than EasyWriter. This system has more than enough functions as an introductory word processor and offers some excellent features. It is also relatively easy to install and use.

My personal preference is Volkswriter Deluxe. The features that bothered me were the lack of a spelling

checker (which you can overcome) and the abysmal configuration program (which you only have to use once). But its other features far outweigh these deficiencies. It is an inexpensive package that has many features found in word processors costing twice as much. ■

Convert 3 to 2000: Upward Mobility

by Gary Shade

★★★★★

Convert 3 to 2000 runs on the Model III (48K) and the Tandy 1000, 1200, 2000 (128K) and IBM PC compatibles. It requires two disk drives. Educational Micro Services, Inc., P.O. Box 471, Chester, NJ 07930. \$139.

Easy to use: ★★★★★

Good docs: ★★★★★

Bug free: ★★★★★

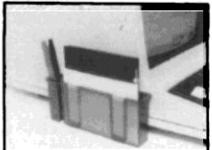
Does the job: ★★★★★

Convert 3 to 2000 is a file transfer utility that lets you move Basic, ASCII, or binary files from the Models I and III to the Tandy 1000, 1200, 2000, or the IBM PC and compatibles. It's the best such program I've seen, well worth its higher price over similar programs.

Unlike other file transfer programs that require a hardware link between two computers, Convert transfers all files from disk to disk under software control. For instance, to transfer a Model III program to a Model 1000, you would format an MS-DOS disk on your Model III, transfer the Model III program to that disk, move the disk to the 1000 and run it through Convert's conversion program, then manually edit any problem lines Convert points out.

The problem in transferring Basic files is that some computers use different versions of Basic. The Basic interpreter of one computer contains key words not found or implemented differently in another. For example, the GW-Basic on most MS-DOS computers implements the random statement (RND) differently from that in Model III Basic. Convert 3 to 2000 addresses most of the problems involved in the successful transfer of files from one computer to another.

The two program disks included in the package are Hypercross, for the Model III, and the CVN32000 disk, which runs on the MS-DOS machines.

NEW**STOR-A-BIT**
Active Storage**SPECIAL
STORAGE PAK
OFFER**
DISKFILE (1)
STOR-A-BIT (1)
(10) SS/DD POLAR
DISKETTES**29.95** per package
add 2.50 for DS/DD

order from: **LAMBDA**
BOX 756, Dover, NH 03820
Toll Free 1-800-258-7148 in NH 603-742-7717
Visa - Mastercard - Check - Money Orders
add 2.50 shipping per order

Introducing Polar Diskettes

Manufacturer's Lifetime Warranty

	10	100	1000	Retail
5 1/4 " SS/DD	13.25	12.50	11.25	17.95
DS/DD	15.95	14.95	13.50	22.95
100% Certified-Soft sectored with reinforced hubs.				

DISKFILE Retail 19.95 Special 16.95

For dustfree protection of your Software, Diskfile provides storage for fifty 5 1/4" floppy disks. Vertical filing prevents warping. Comes with 5 adjustable dividers with moveable tabs and built-in carrying handle. Compact 8" x 7" x 7"



For Canadian Pricing and orders call
Trinetics LTD
1-800-267-4292

**Tidbit #20**

```

130 CLS
140 PRINT: PRINT "Enter filename of /TXT file in"
150 PRINT "which to change periods to commas ,"; LINE INPUT FILENAME$ 
160 F1$=FILENAME$"/CHG:1"; FILENAME$=FILENAME$"/TXT"
170 OPEN "I", 1, FILENAME$ 
180 OPEN "O", 2, F1$ 
190 IF EOF(1) THEN 260 
200 LINE INPUT #1, A$ 
210 IF INSTR(A$,",DATA")>8 THEN 250 
220 IF INSTR(A$,".")=0 THEN 250 
230 MID$(A$,INSTR(A$,"."),1)="," 
240 GOTO 220 
250 PRINT #2, A$: GOTO 190 
260 CLOSE 
270 PRINT: PRINT "File saved as ";F1$: END

```

Here's a better way to type in long lists of data statements on your Model 4. Use the numeric keypad, separating each integer with a period. Save the lines in an ASCII file with a /TXT extension, then use my program to convert the periods to commas. At the prompt, type in the text file's name without extension or drive number. The program saves the converted file with a /CHG extension on drive 1.

*Michael Shroud
Greeley, CO*

TRS 80 Computers**NEW Computers, Accessories & Software
Manufacture Warranty**

26-5103 Model 2000	\$2200
26-1069 Model 4	\$970
26-4005 Model 12	\$2800
26-3802 Mod. 100-24K	

26-5111 Monitor	Now available
26-1158 Printer	Model 1000, 1200HD
26-1256 Printer	AND 2000.
26-3801 Mod. 100-8K	

Low, Low Prices: Please Call

Visa — MasterCard — American Express
Cashier's Check — Money Order

**Business Telephone Systems—Discount Prices—
Install your own. Completely modular.
Call for Prices**

Computer Specialist available for assistance.

**TALLEY
COMMUNICATIONS CO.**

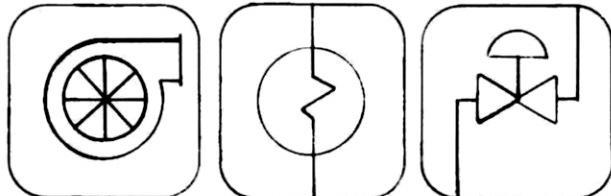
P.O. Box 193 • 121 N. State St.

Decatur, Texas 76234 • 817-627-5585 • 817-627-1017

Call for other computer, telephone and accessory prices!

Fast Delivery

References Available

ENGINEER'S AIDE

THE ULTIMATE ENGINEERING PROGRAM THAT WILL DRAMATICALLY IMPROVE THE ACCURACY, CONSISTENCY, AND DOCUMENTATION OF YOUR ENGINEERING CALCULATIONS AND SPECIFICATIONS. WRITTEN IN A SELF PROMPTING FORMAT USING PLAIN ENGLISH COMMANDS, YOU CAN IMMEDIATELY PUT THIS PROGRAM TO WORK TO IMPROVE YOUR ENGINEERING EFFICIENCY WHILE FURTHERING YOUR CAREER. INCORPORATING A WEALTH OF ENGINEERING KNOWLEDGE INTO A QUICKLY USABLE FORM, THIS VALUABLE PROGRAM CAN PAY FOR ITSELF WITH JUST ONE USE. THIS IS ONE AIDE YOU CAN DEPEND ON FOR PROFESSIONAL RESULTS (WITH FORMATTED PRINTOUTS MADE AVAILABLE IN EACH SEGMENT OF THE PROGRAM). JUST LOOK AT WHAT ENGINEER'S AIDE CAN DO.

- PIPELINE SIZING
- PUMP/COMPRESSOR SIZING
- HEAT EXCHANGER SIZING
- CONTROL VALVE SIZING
- ORIFICE/RELIEF SIZING
- ENERGY COST CALCULATOR
- SPECIFICATION WRITER

PRICE: \$149.50 SPECIFY IBM PC, TRS 80 MODEL 4, OR TRS 80 MODEL III VERSION

**ENGINEERING
PROGRAMMING CONCEPTS**

POST OFFICE BOX 925, CAMARILLO, CA 93011, 805-484-5381

TERMS: MONEY ORDER, CHECK, OR COD. ADD \$3.00 POSTAGE/HANDLING, \$5.00 FOREIGN. SALES TAX IN CA. 20 DAY MONEY BACK GUARANTEE IF NOT SATISFIED.

REVIEWS

HyperCross

The Model III Hypercross disk contains the programs HXI/CMD and HXIII/CMD. The disk comes in single-density TRSDOS 2.3 Model I format. Model III users must use their DOS Convert utility to transfer HXIII/CMD from the Model I-formatted disk to one with TRSDOS 1.3B. The programs HXI/CMD and HXIII/CMD let you format an MS-/PC-DOS single-sided, double-density disk, display either drive's directory, and copy files from one drive (and format) to another.

The Hypercross software HXIII/CMD runs under any of the following Model III operating systems: DOS-PLUS 3.4 or 3.5, LDOS, MULTIDOS, NEWDOS/80 2.0, and TRSDOS 1.3. When you initially run the program, you must specify the type of Model III DOS on the disk in drive zero. Once you do so, Hypercross displays the menu shown in Fig. 1. The program assumes that you have a Model III-formatted disk in drive zero and either a blank or an MS-DOS-formatted disk in drive 1.

Select from the following:

- 0 Directory of TRS-80 drive zero.
- 1 Directory of MS-DOS drive 1.
- 2 Copy file from drive zero to 1.
- 3 Copy file from drive 1 to zero.
- 4 Format a disk in drive 1.
- 5 Exit program.

Figure 1. Main Menu of Hypercross program.

After transferring the file to the MS-DOS-formatted disk in drive 1, remove the MS-DOS disk and insert it in the MS-DOS computer. If the file is a Basic program, run the CNV32000 conversion program on the MS-DOS computer. This converts the Model III Basic program to a format compatible with Tandy or IBM Basic. The program automatically inserts spaces between key words and replaces PRINT@ statements with Locate statements. Chapter 3 of the manual explains the reasons for any problems that occur during the conversion and tells you how to overcome them.

Some possible errors include PEEK/POKE statements, OUT/INP() statements, and others. Since

PEEK, POKE, OUT, and INP statements use machine-specific memory or port addresses, CNV32000 flags the line numbers where it encounters such statements. It's your responsibility to then make any necessary corrections, but the manual contains enough information for you to do so.

The manual also contains information on how to change any of the Model III Basic CMD commands. It further discusses special memory locations the Model III uses to monitor or change certain functions such as memory location 16409 (the Caps Lock switch) or memory location 16412 (the cursor blink switch). In most instances, the manual includes suggestions on how to replace the Model III statements with GW-Basic statements that do the same thing.

Testing the Software

I initially began testing Convert using a long Basic program found in an old issue of *80 Micro* called Kings and Castles (August 1983, p. 246). The conversion program performed flawlessly. When I ran CNV32000, I selected the options I wanted from the menu shown in Fig. 2. I directed the error report to the printer by selecting option D. What resulted was over four pages of errors or warnings produced by the conversion program. Most involved incompatible key words like RND, and PEEK/POKE statements that you'd have to edit manually after the conversion for compatibility.

I really had little need to see Kings and Castles run on the Tandy 2000, so I didn't bother to edit the four pages of errors. Instead, I developed a test program (Pro-

gram Listing 1) and ran it through the program (Program Listing 2).

Notice the difference between the listings. The Model III version contains no spaces between key words and operands, and the converted program does. CNV32000 automatically inserted the spaces when it made the conversion and replaced the Model III PRINT@ statement with an equivalent Locate statement.

Listing 3 contains the Model III program error statements produced by the conversion software. Notice that a warning error occurred in line 140 due to the RND statement. The manual suggests you substitute RND with INT (RND*NUM) + 1, where NUM is the range you want to assign

Code	Option
A	Display errors on screen.
B	Display Model III program lines on screen.
C	Display IBM PC program lines on screen.
D	List errors on printer.
E	List Model III program lines on printer.
F	List IBM PC program lines on Printer.
G	Pause after each error condition.
H	Sound Bell after each error condition.
I	Save converted PC version on disk.
J	Insert line feed after each ":".
K	Insert line feed before If, Then, Else.
L	Remove remarks and comments from PC version.
	Type the codes for all desired options and then press the enter key.

Figure 2. Main menu of Convert 3 to 2000 program.

Program Listing 1. Model III program listing before conversion.

```
10 'This is a test of the Model 3 to Tandy 2000 conversion
20 'Software (CONV 3 To 2000). A short program to illustrate
30 'the program's utility follows.
40 ***** Generate table of squares
50 FORI=0TO100
60 PRINTI,I[2,I[3
70 NEXTI
80 '
90 ***** TEST RANDOM NUMBER FUNCTION
100 ***** OBTAIN A NUMBER BETWEEN 5 AND 7.
110 FORX=1TO260:NEXTX
120 CLS:PRINT@535,"Random Number Test "
130 FORRN=1TO100
140 I=RND(10):IFI<4ORI>8THEN140
150 PRINTI;
160 NEXTRN
170 '
180 END
```

End

Back Issues



January 1980 to June 1980 . . . \$3.00

July 1980 to May 1983 \$3.50

June 1983 to present \$4.50

Add \$1.00 per magazine for shipping.

10 or more magazines add \$7.50 per order for shipping.

80Micro

Back Issue Order Dept.

80 Pine Street

Peterborough, NH 03458

Circle 103 on Reader Service card.

BRICKWARE

If you invest in brick and mortar, then you should invest in our brickware, Investor III™. Designed by real estate professionals to work on the IBM PC or TRS-80,

Investor III™ is a comprehensive software package that aids in investment analysis of property, whether commercial or residential, small or large. It shows

both the tax and cash aspects of an investment opportunity and is flexible enough to allow you to vary a number

of key assumptions (such as cash flow, phased investments, multiple mortgages, and tax parameters) and see the results in an instant. So if you are serious about brick

and mortar, look at our brickware. It will help you lay a solid foundation for your investment strategy.

Contact your local dealer.

GOOD

SOFTWARE CORP.

A Division of The Goodman Group, Inc.

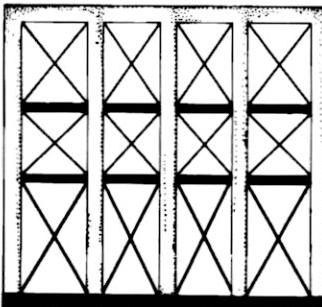
12900 Preston Road

Dallas, Texas 75230

(214) 239-6085

\$249.00 Suggested Retail

**Making dollars and sense
out of information.**



PRICES YOU CAN'T BEAT!..

COMPUTERS

SANYO 550 - 1 (1 160K DRIVE)	\$ 650
SANYO 550 - 2 (2 160K DRIVES)	680
SANYO 555 - 1 (1 320K DRIVE)	950
SANYO 555 - 2 (2 320K DRIVES)	970
SANYO 555 - 4 (2 800K DRIVES)	1100
NEC8201 (LAP PORTABLE LIKE MOD 100)	399
TANDY 1000 (IBM COMPAT.)	1025
TANDY 1200	CALL
TANDY/IBM EXPANSION BOARDS	CALL

EXPANSIONS

MODEL 3 & 4 64K UPGRADE	\$ 230
HOLMES VID 8 + CPM 2.2	350
HOLMES 5" & 8" DOUBLER	125
GENERIC DOUBLER	99

COMMUNICATIONS SPECIAL

MTERM: SMART TERMINAL PROGRAM AND VOLKSMODEM: 360BD MODEM MOD 1/2	\$ 99
---	-------

MONITORS

TAXAN 12" AMBER	\$ 119
TAXAN 12" GREEN	115
TAXAN RGB III	385

TRS 80 SOFTWARE

MTERM	\$ 50
OMNITERM	63
DOS PLUS 3 - 5	49

PRINTERS

EPSON RX 80	\$ 230
EPSON RX 100	375
EPSON FX 80	385
EPSON FX 100	595
C-ITOH 8510AP	329
C-ITOH 8510	345
C-ITOH 1550	520
C-ITOH A-10	479
C-ITOH F-10 40 CPS	889
C-ITOH F-10 55 CPS	1089
JUKI 6100	385
JUKI 6300	CALL
OKIDATA 82A	289
OKIDATA 83A	500
OKIDATA 92	365
OKIDATA 93	575
OKIDATA 84	650
OKIDATA 2410	1775
PANASONIC 1090	195
PANASONIC 1092	435
PANASONIC 1091	265
PANASONIC 1093	675
SILVER-REED 400	275
SILVER-REED 500	315
SILVER-REED 550	399
SILVER-REED 770	799
STAR GEMINI 10X	235
STAR GEMINI 15X	345
STAR DELTA 10	315
STAR DELTA 15	435
STAR RADIX 10	495
STAR RADIX 15	550
TOSHIBA 1340	759
TOSHIBA 1351	1199

MODEMS

HAYES: 300 BD	\$ 205
HAYES: 300/1200 BD	465
ANCHOR: VOLKSMODEM 300 BD	59
ANCHOR: VOLKSMODEM 1200 BD	199
ANCHOR: MARK X AUTO 300 BD	125
ANCHOR: MARK XII AUTO 300/1200 BD	229

ACCOUNTING SPECIAL M.A.S. - 80

GENERAL LEDGER, ACCOUNTS REC., ACCOUNTS PAY., CHECK REGISTER, INTEGRATED SYSTEM. **ONLY \$ 299**

DISK DRIVES (BARE)

TANDON	50 - 1	40 TR S/S	\$ 99
TANDON	55 - 4	80 TR D/S	150
TANDON	100 - 1	40 TR S/S	129
TANDON	100 - 2	40 TR D/S	160
TANDON	100 - 4	80 TR D/S	165
FULL SIZE CASES & PWR. SUP.		47	
TEAC	55 B	40 TR S/S	129
TEAC	55 F	80 TR D/S	160
CHINON		40 TR S/S	129
MATSHUSHITA		40 TR D/S	160
SLIMLINE PWR. SUP. & CASE/DUAL		47/58	
10 MEGA BYTE HARD DISK		\$ 650	

**24 HOUR TOLL FREE ORDERS
VISA/MASTER CHARGE ONLY:
(800) 633-2252 EXT 720**

ALL QUESTIONS: (313) 538-1112

VESPA COMPUTER OUTLET
16727 Patton Detroit MI 48219

MICHIGAN RESIDENTS ADD 4% SALES TAX.
POSTAGE, CALL FOR CHARGES. (NON CERTIFIED
CHECKS ALLOW 2 WEEKS TO CLEAR). MASTER
CARD AND VISA ADD 3%. NO C.O.D. NO NET TERMS.

REVIEWS

Program Listing 2. Model III program listing after conversion.

```
10 'This is a test of the Model 3 to Tandy 2000 conversion
20 'Software (CONV 3 To 2000). A short program to illustrate
30 'the program's utility follows.
40 '***** Generate table of squares
50 FOR I=0 TO 100
60 PRINT I,I[2],I[3]
70 NEXT I
80 '
90 '***** TEST RANDOM NUMBER FUNCTION
100 '***** OBTAIN A NUMBER BETWEEN 5 AND 7.
110 FOR X=1 TO 260:
NEXT X
120 CLS:
LOCATE 9,24:
PRINT"Random Number Test "
130 FOR RN=1 TO 100
140 I= INT (RND*10)+1:
IF I<4 OR I>8
THEN 140
150 PRINT I;
160 NEXT RN
170 '
```

End

Program Listing 3. Error statements produced by Convert 3 to 2000 and printed out.

```
-MOD 3- 10 'This is a test of the Model 3 to Tandy 2000 conversion
10 ' This is a test of the Model 3 to Tandy 2000 conversion

-MOD 3- 20 'Software (CONV 3 To 2000). A short program to illustrate
20 ' Software (CONV To 2000). A short program to illustrate

-MOD 3- 30 'the program's utility follows.
30 'the program's utility follows.

-MOD 3-40 '***** Generate table of squares
40 ' ***** Generate table of squares

-MOD 3- 50 FOR I=0 TO 100
50 FOR I=0 TO 100

-MOD 3- 60 PRINT I, I^2,I^3
60 PRINT I, I^2,I^3

-MOD 3- 70 NEXT I
70 NEXT I

-MOD 3- 80 '
80 '

-MOD 3- 90 ' ***** TEST RANDOM NUMBER FUNCTION
90 ' ***** TEST RANDOM NUMBER FUNCTION

-MOD 3- 100 '***** OBTAIN A NUMBER BETWEEN 5 AND 7.
100 ' ***** OBTAIN A NUMBER BETWEEN 5 AND 7.

-MOD 3- 110 FOR X=1 TO 260:NEXT X
110 FOR X=1 TO 260:
NEXT X

-MOD 3- 120 CLS:PRINT@535, "RANDOM NUMBER TEST "
120 CLS:
LOCATE 9,24:
PRINT"RANDOM NUMBER TEST "

-MOD 3- 130 FOR RN=1 TO 100
130 FOR RN=1 TO 100

<<< ERROR 28 >>> Line # 140  WARNING ERROR      <<RND>>
RND() statement encountered.
-MOD 3- 140 I=RND(10):IFI<40RI>8THEN140
140 I=RND(10):
IF I<4 OR I>8
THEN 140

-MOD 3- 150 PRINT I;
150 PRINT I;

-MOD 3- 160 NEXT RN
160 NEXT RN

-MOD 3- 170'
170'
```

End

the random number. The program in Listing 1 contains the statement $I = RND(10)$ at line 140. You should replace this with the statement $I = INT(RND*10) + 1$ in the MS-DOS converted program (Listing 2).

Conclusions

This is the most versatile file transfer utility that I've used. I was able to transfer any type of file to or from a Model I or III and my MS-DOS computers. The Basic conversion utility CNV32000 cleaned up the transferred Model III program, flagged potential compatibility problems and key words, and automatically substituted many key words such as Locate for PRINT@.

The big advantage I see in this software is that I don't need a serial card in the IBM PC, or a null cable to transfer a file between computers. I simply remove the MS-DOS-formatted disk from the Model I or III and put it in the PC. File transfers couldn't be easier.

The company advertises three conversion packages: One for converting programs from Model III to Model 4 Basic, one for Model III to Model 2000 conversions, and one for Model III to IBM PC and compatible Basics. The Model III to 4 package costs \$49.95, while the other two are \$139.95 each. The only difference between the MS-DOS versions is an addendum to the IBM PC program telling you to modify one line containing the Width statement so that it agrees with Advanced Basic syntax. This difference has nothing to do with how it converts the Model III Basic, but with how it prints out the information during conversion. The review package worked on the Tandy 2000, IBM PC, Compaq, and the Tandy 1000 and 1200.

The worst thing about the program is the manual. The program's documentation consists of 34 pages housed in an 8½- by 11-inch three-ring binder. It's poorly organized and lacks an index. While it provides a lot of useful information, the manufacturer should have included a speedier way to access that information. A novice user will have some trouble using the software because of this.

While I feel that utility programs such as these should be priced from \$75 to \$90, Convert 3 to 2000 works so well it merits the \$139.95 price tag it carries. ■

Circle 350 on Reader Service card.

TRSDOS

MENU		LIST
1.....	1.....	Page 1
2.....	2.....	Call N
3.....	3.....	9:00 Postpaid (301) 598-4532

Send your
Check or Money
Order to En Fleur
Corp. 2494 Sun Valley Circle
Silver Spring Md. 20906
KEEP A EYE ON EN FLEUR!
WE'RE PRICE BUSTERS
[Md. Residents Add 5% Tax]

WINDOWPAD FOR I III IV

an integrated windowing
and note processing
utility. It enables the
operator to (1) work
independent of an
application program;
(2) write, recall and
edit notes efficiently;
and, (3) set timed Pop
Up Window Memos.
**UP TO 8 WINDOWS CAN BE
DISPLAYED AT ONE TIME.**

Circle 456 on Reader Service card.

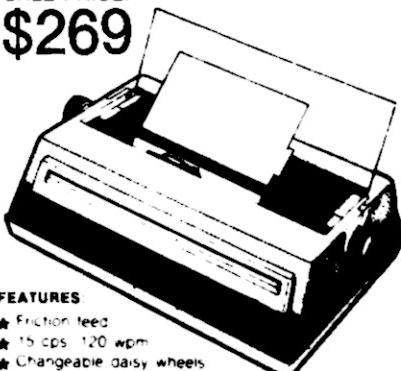
SGM DAISY WHEEL

New Smith Corona L-1000

True letter quality printer for less than the cost of an
office typewriter! Priced \$500 less than other popular
daisy wheel printers!

SALE PRICE:

\$269



FEATURES

- ★ Friction feed
- ★ 15 cps 120 wpm
- ★ Changeable daisy wheels
- ★ Parallel or serial interface
- ★ Compatible with R.S. Apple etc

SUNLOCK SYSTEMS

210 Conner Rd.
Mechanicsville, VA 23111

(804)-746-1600

ADDITIONAL PRINTER SPECIALS

Epson	Okidata	Comrex	I	II	\$389	Citoh	8510	\$329	
RX80	\$239	ML82	\$299	Comrex	III	629	Citoh	F10	899
80FT+	299	ML83	519	Gemini	10X	269	Citoh	1550	519
RX100	399	ML84	649	Gem. PrType	329	OkiMate	20	149	
FX80+	429	ML92	369	Gem. Radix10	519	Sv. Reed	550	449	
FX100+599	579	ML93	579	Gemini	15x	379	LO	1500	1039
JX 80	579	ML182	2291	Sv. Reed	379	Zen Monitor	99		

TO ORDER CALL TOLL FREE 800-388-9191

In Virginia call 804-321-9191

We accept MasterCard, Visa and CODs

Circle 388 on Reader Service card.

MODEL 100 C COMPILER

Now you can write efficient programs for your TRS-80 model 100 with ease. Or, learn the essentials of C programming while traveling!

C/100 - THE "PORTABLE" C COMPILER

Cassette version \$49.00
Disk/Video interface version \$59.00
Model II version (run on mod II, then download object code to model 100) \$79.00
Model III version (as above for Mod III) \$79.00

Write or call for information on other TRS-80 software.

MODELS II, 12, 16 MODELS III, 4

TRS/C C COMPILER

Full K&R with source to the function library. UNIX compatible \$85.00

ZSPF EDITOR

ZPF, the choice of most mainframe programmers, is now available for Z80 machines. And it's panel driven so you can customize it! \$75.00

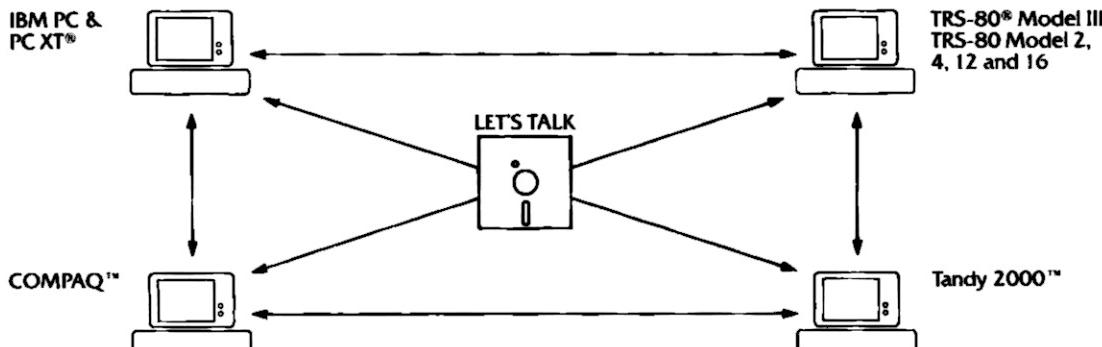
business utility software

109 minna ste 423 san francisco ca 94105

(415) 397-2000

Circle 496 on Reader Service card.

Communications Gap? LET'S TALK™!



**LET'S TALK CLOSES THE COMMUNICATIONS GAP
BETWEEN TODAY'S POPULAR PERSONAL
COMPUTERS.**

LET'S TALK is a complete package for fully supported communications between any of these computers. In any direction. Without additional expense.

LET'S TALK is a simple, straightforward program that transfers ASCII data files, including BASIC and VisiCalc®, from one computer to

another. Precisely. Easily. Without professional, expensive data processing expertise.

LET'S TALK allows two computers to communicate directly with each other in a "conversational mode" when not actually transferring data. And, LET'S TALK can send or retrieve files of any size from unattended computers, at three different speeds.

**GROWTH AND EXPANSION REQUIRE
OPEN COMMUNICATION. LET'S TALK.**



Making dollars and sense out of information.

Now available at Radio Shack stores through
Express Order Software Program.

TRS-80 is a registered trademark of Tandy Corporation. Tandy 2000 is a trademark of Tandy Corporation. Visi Calc is a registered trademark of VisiCorp. IBM PC and PC XT are registered trademarks of IBM Corporation. COMPAQ is a trademark of Compaq Computer Corporation.

a division of the goodman group, inc. 12900 Preston Rd., Dallas, Texas 75230 (214) 239-6085
LET'S TALK includes all diskettes for each of the above computers. Suggested retail price \$179.00 + \$5.00 shipping

Making Connections

MLink (\$250) establishes micro to mainframe and micro to micro communications for the Model 4 running CP/M and the Models 1000, 1200, and 2000 under MS/DOS.

The package features on-line help functions, directory-based autodialing, and auto log-on. MLink also operates as a terminal emulator, data transfer utility, remote bulletin board, e-mail system, and as control software for distributed processing. You can also create automatic or menu-driven communications links.

For more information, contact Corporate Microsystems Inc. at Box 277, Etna, NH 03750, 603-448-5193.

Circle 551 on Reader Service card.

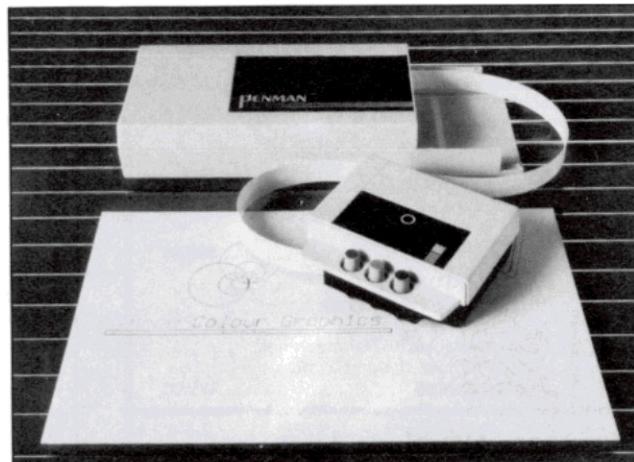
Windows to CP/M

Monte's Window (\$49) can open windows for your 128K Model 4 with CP/M. A touch of the keys opens a software window containing a note pad, appointment calendar, calculator, and mini data base manager.

This desk organizer lets you interrupt program operation and display Monte's Window on-screen. One-key control resumes execution. Monte's Window uses no user RAM.

For more details, contact Montezuma Micro at Redbird Airport, Hangar 18, Box 32027, Dallas, TX 75232, 214-339-5104.

Circle 556 on Reader Service card.



The Penman Robot Plotter plots color graphics on up to a nine square-foot area.

Plotting Robot

Axiom's Penman three-pen robot plotter (\$399) propels itself over a 3- by 3-foot area to produce multicolor graphics. Penman attaches to any computer through its RS-232 or serial port.

The unit's high-level commands include a built-in character set, arcs, and circles. The plotting vehicle measures four inches square and aligns itself with paper edges.

Penman works with many applications programs including Lotus 1-2-3, Visi-Calc, and Logo. For more information, contact Axiom, 1014 Griswold Ave., San Fernando, CA 91340, 213-365-9521.

Circle 559 on Reader Service card.

On-Line Learning

The Information Online Toolkit (\$29.95) combines *The Microcomputer User's Guide to Information On-*

line with SuperScout communication software for the Models 1000 and 1200.

The guide includes step-by-step instructions on searching on-line data bases, downloading, sending mail, and talking to others. Users can subscribe to Business Computer Network Inc.'s service that provides 20 free accesses per month to information services and unlimited point-to-point communications.

For more details, contact Hayden Book Co., 10 Mulholland Drive, Hasbrouck Heights, NJ 07604, 201-393-6306.

Circle 562 on Reader Service card.

Unearthly Software

Tracking Halley's comet is as easy as looking down—at your Model 100. Astro (\$39.95) turns your Model 100 into a portable planetarium. It plots a picture of the sky for any date, time, or location, and provides

information on celestial bodies of interest.

Move the cursor to the appropriate celestial body and Astro displays the name, brightness magnitude, direction, and altitude. Type in the name of the celestial body, and Astro points to it with the cursor.

Contact Loquor Enterprises, 3 Heneage Lane, Hanover, NH 03755 for more details.

Circle 555 on Reader Service card.

Utilities 'R' Us

Dowling Enterprises Inc. (Box 12726, Albany, NY 12212, 518-459-2713) offers four utility programs for the Model I. Basic Screen Handler (\$35) lets you format and save full screens for use in Basic programs. Command File Processor (\$25) saves a series of commands in a file for automating command sequences.

Patch (\$15) alters Assembly-language object code without reassembling and linking the source code. D1Copy (\$15) copies files on one-drive systems.

Circle 563 on Reader Service card.

Fast Tapes

The HHCI Tape Operating System (\$49.95) gives Model III cassette users faster input/output at a fraction of the cost of disk drives.

The system reads and writes data via CTR-41, CTR-80A, or CCR-81 cassette recorders at 8,000 baud, 50 times faster than

COMPUTRONICSTM

N.C.

• • EVERYTHING FOR YOUR TRS-80™ • ATARI™ • APPLE™ • PET™ • CP/M™ • XEROX™ • IBM™ • OSBORNE™ • •

* TRS-80 is a trademark of the Radio Shack Division of Tandy Corp. * ATARI is a trademark of Atari Inc. * APPLE is a trademark of Apple Corp. * PET is a trademark of Commodore
* CP/M is a trademark of Digital Research. * XEROX is a trademark of Xerox Corp. * IBM is a trademark of IBM Corp. * OSBORNE is a trademark of Osborne Corp.



BUSINESS PAC 100

100 Ready-To-Run Business Programs

★ All orders processed within 24-Hours
★ 30-Day money back guarantee

(ON CASSETTE OR DISKETTE)....Includes 128 Page Users Manual....
Inventory Control....Payroll....Bookkeeping System....Stock Calculations....
Checkbook Maintenance....Accounts Receivable....Accounts Payable.....

BUSINESS 100 PROGRAM LIST

NAME	DESCRIPTION
1 RULE78	Interest Apportionment by Rule of the 78's
2 ANNU1	Annuity computation program
3 DATE	Time between dates
4 DAYYEAR	Day of year a particular date falls on
5 LEASEINT	Interest rate on lease
6 BREAKVN	Break-even analysis
7 DEPRSL	Straightline depreciation
8 DEPRSY	Sum of the digits depreciation
9 DEPRDB	Declining balance depreciation
10 DEPRDBB	Double declining balance depreciation
11 TAXDEP	Cash flow vs. depreciation tables
12 CHECK2	Prints NEBS checks along with daily register
13 CHECKBK1	Checkbook maintenance program
14 MORTGAGE/A	Mortgage amortization table
15 MULTMON	Computes time needed for money to double, triple, etc.
16 SALVAGE	Determines salvage value of an investment
17 RRVARIN	Rate of return on investment with variable inflows
18 RRCONST	Rate of return on investment with constant inflows
19 EFFECT	Effective interest rate of a loan
20 FVAL	Future value of an investment (compound interest)
21 PVAL	Present value of a future amount
22 LOANPAY	Amount of payment on a loan
23 REGWITH	Equal withdrawals from investment to leave 0 over
24 SIMPDISK	Simple discount analysis
25 DATEVAL	Equivalent & nonequivalent dated values for oblig.
26 ANNUDEF	Present value of deferred annuities
27 MARKUP	% Markup analysis for items
28 SINKFUND	Sinking fund amortization program
29 BONDVAL	Value of a bond
30 DEPLET	Depletion analysis
31 BLACKSH	Black Scholes options analysis
32 STOCVAL1	Expected return on stock via discounts dividends
33 WARVAL	Value of a warrant
34 BONDVAL2	Value of a bond
35 EPSEST	Estimate of future earnings per share for company
36 BETAALPH	Computes alpha and beta variables for stock
37 SHARPE1	Portfolio selection model-i.e. what stocks to hold
38 OPTWRITE	Option writing computations
39 RTVAL	Value of a right
40 EXPVAL	Expected value analysis
41 BAYES	Bayesian decisions
42 VALPRINF	Value of perfect information
43 VALADINF	Value of additional information
44 UTILITY	Derives utility function
45 SIMPLEX	Linear programming solution by simplex method
46 TRANS	Transportation method for linear programming
47 EOQ	Economic order quantity inventory model
48 QUEUE1	Single server queuing (waiting line) model
49 CVP	Cost-volume-profit analysis
50 CONDPROF	Conditional profit tables
51 OPTLOSS	Opportunity loss tables
52 FQUOQ	Fixed quantity economic order quantity model
53 FQEOWSH	As above but with shortages permitted
54 FQEQQPB	As above but with quantity price breaks
55 QUEUECB	Cost-benefit waiting line analysis
56 NCFANAL	Net cash-flow analysis for simple investment
57 PROFIND	Profitability index of a project
58 CAP1	Cap. Asset Pr. Model analysis of project

59 WACC	Weighted average cost of capital
60 COMPBAL	True rate on loan with compensating bal. required
61 DISCBAL	True rate on discounted loan
62 MERGANAL	Merger analysis computations
63 FINRAT	Financial ratios for a firm
64 NPV	Net present value of project
65 PRINDLAS	Laspeyres price index
66 PRINDPA	Pasche price index
67 SEASIND	Constructs seasonal quantity indices for company
68 TIMETR	Time series analysis linear trend
69 TIMEMOV	Time series analysis moving average trend
70 FUPRINF	Future price estimation with inflation
71 MAILPAC	Mailing list system
72 LETWRIT	Letter writing system-links with MAILPAC
73 SORT3	Sorts list of names
74 LABEL1	Shipping label maker
75 LABEL2	Name label maker
76 BUSBUJD	DOME business bookkeeping system
77 TIMECLK	Computes weeks total hours from timeclock info.
78 ACCTPAY	In memory accounts payable system-storage permitted
79 INVOICE	Generate invoice on screen and print on printer
80 INVENT2	In memory inventory control system
81 TELDIR	Computerized telephone directory
82 TIMUSAN	Time use analysis
83 ASSIGN	Use of assignment algorithm for optimal job assign.
84 ACCTREC	In memory accounts receivable system-storage ok
85 TERMSPAY	Compares 3 methods of repayment of loans
86 PAYNET	Computes gross pay required for given net
87 SELLPR	Computes selling price for given after tax amount
88 ARBCOMP	Arbitrage computations
89 DEPRSF	Smiling fund depreciation
90 IUPSZONE	Finds UPS zones from zip code
91 ENVELOPE	Types envelope including return address
92 AUTOEXP	Automobile expense analysis
93 INFILE	Insurance policy file
94 PAYROLL2	In memory payroll system
95 DILANAL	Dilution analysis
96 LOANAFFD	Loan amount a borrower can afford
97 RENTPRCH	Purchase price for rental property
98 SALELEAS	Sale-leaseback analysis
99 RRCOMVBD	Investor's rate of return on convertible bond
100 PORTVAL9	Stock market portfolio storage-program

- TRS-80 Cassette Version \$99.95
- TRS-80 (Mod-I or III), Pet, Apple or Atari Versions \$99.95
- TRS-80 Mod-II, IBM, Osborne and CP/M Versions \$149.95

ADD \$3.00 FOR SHIPPING IN UPS AREAS
ADD \$4.00 FOR C.O.D. OR NON-UPS AREAS
ADD \$5.00 TO CANADA AND MEXICO
ADD PROPER POSTAGE OUTSIDE OF U.S., CANADA AND MEXICO

COMPUTRONICSTM
MATHEMATICAL APPLICATIONS SERVICE

50 N. PASACK ROAD
SPRING VALLEY, NEW YORK 10977

ASK FOR OUR 64-PAGE CATALOG
DEALER INQUIRIES INVITED

**NEW TOLL-FREE
ORDER LINE
(OUTSIDE OF N.Y. STATE)
(800) 431-2818**

**AMERICAN
EXPRESS**
VISA
**24 HOUR
ORDER
LINE**
(914) 425-1535
ALL PRICES & SPECIFICATIONS SUBJECT TO CHANGE
DELIVERY SUBJECT TO AVAILABILITY

\$999.

—TANDY 1000 COMPUTER— THE AFFORDABLE PC COMPATIBLE AT AN INCREDIBLE LOW PRICE OF \$999.

FEATURES INCLUDE:

- 128K RAM
- Mono & Color Adapters Included
- Video Interface
- 360K Half Height Drive
- Three Voice Sound
- Built-In Speaker & Audio Output Jacks
- Parallel Printer Interface
- Two Joystick Ports
- Light Pen Interface
- Three PC Compatible Expansion Slots



MAJOR CREDIT CARDS ACCEPTED

Price Quoted is Cash Discounted.

Credit Card Price is \$1,029.

WE ALSO STOCK • TANDY 1200 HD
• TANDY 2000 • TANDY 6000 • TANDY 200
& MODEL 4. CALL FOR A PRICE QUOTE!



BUY DIRECT BY MAIL OR PHONE
ORDERS ONLY 800-526-5313
INQUIRIES and in NJ 201-728-8080
INFORMATION on your order 201-728-8082

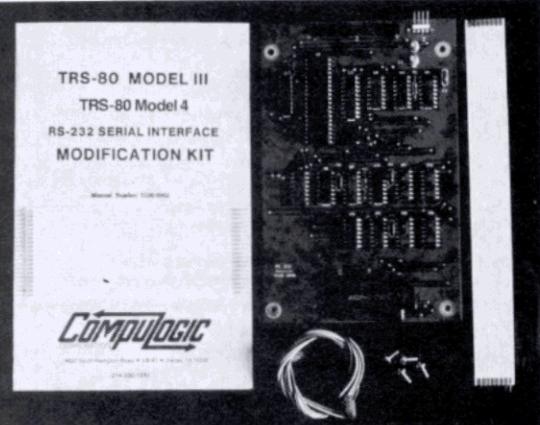
AD NO 1006-5

Sale Ends 5/31/85

Circle 86 on Reader Service card.

THE RS-232 MODEL III MODEL 4

TRS-80 MODEL III
TRS-80 Model 4
RS-232 SERIAL INTERFACE
MODIFICATION KIT



State-of-the-art technology in board design, our direct replacement of Radio Shack's® internal RS-232 board, mounts inside the Model III or 4 on the existing brackets. All cables, screws and complete mounting instructions are included. Non-technical people will find that installation is quick, straight forward and simple requiring less than 15 minutes to complete.

Total compatibility with Radio Shack® and all existing software is maintained. Software programmable baud rates from 50 to 19,200 baud are supported along with programmable word length, stop bits, and parity. May be utilized in either half or full duplex operation.

Outstanding Value

At \$69.95

Only \$69.95

Guaranteed One Full Year

Dealer Inquiries Invited

Please forward payment by a cashier's check or money order.

Visa or Mastercharge also accepted.

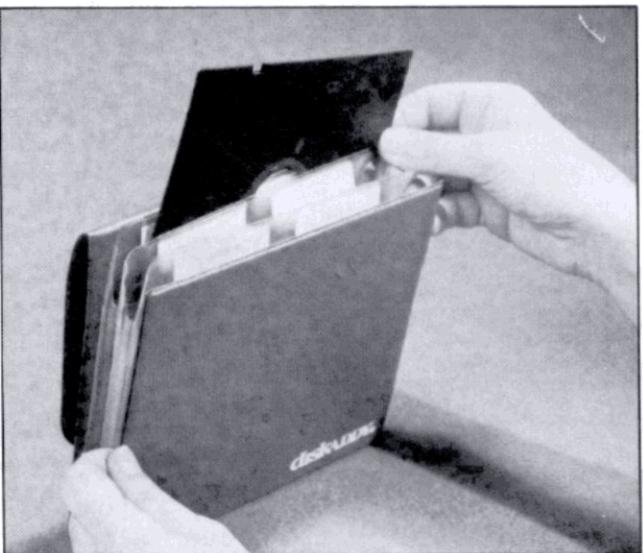
Add \$3.00 shipping & handling

(Foreign orders quoted on request)

CompuLogic

4831 SOUTH HAMPTON RD. LB41
DALLAS, TEXAS 75232
214/330-1332

NEW PRODUCTS



The Diskaddy filer holds up to 22 disks.

normal cassette operation. HHCI TOS accepts commands from the Basic prompt, and includes a directory command.

You can install system hardware in one hour. The system also includes software, installation instructions, and a user's manual. For more details, contact HHCI Tape Systems, 725 Idlewild Road, Bel Air, MD 21014, 301-838-7692.

Circle 560 on Reader Service card.

Expanding Files

Diskaddy (\$14.99) is a portable disk filer that expands like an accordian to

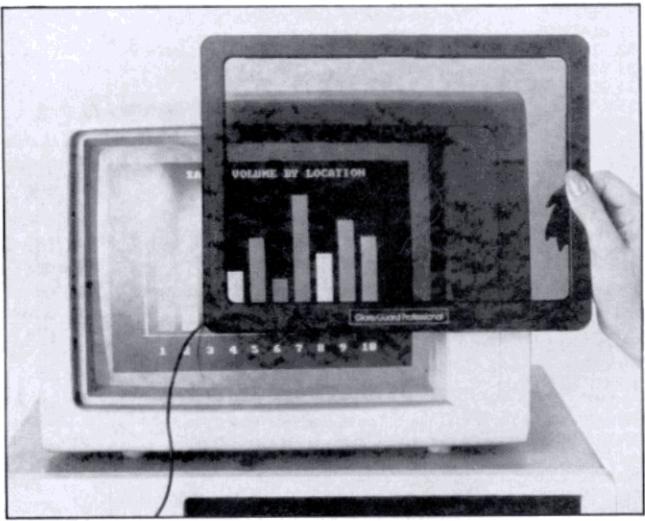
accommodate up to 22 disks. Designed for toting disks in a handbag or briefcase, Diskaddy is available for 5½- and 8-inch disks. A six-disk filer (\$7.99) is also available.

For more details, contact MB International Inc., 4322 Date St., La Mesa, CA 92041, 619-232-8772.

Circle 557 on Reader Service card.

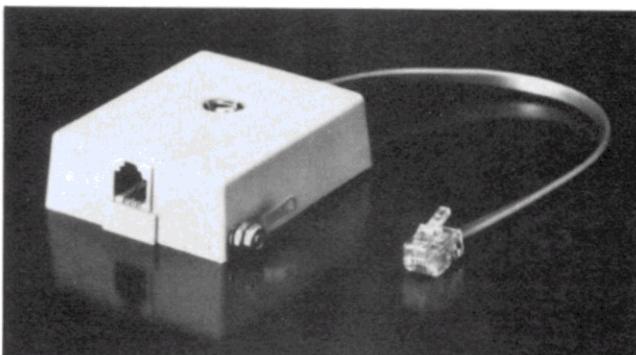
Glare Gone

The Glare/Guard Vantage (\$59) and Professional (\$99) glass antiglare panels reduce glare and static buildup on any CRT. They improve image-to-background



Glare/Guard glass filters eliminate glare without compromising resolution.

NEW PRODUCTS



Indus-Tool's Modem Spike Protector protects your equipment from phone-line transients.

contrast while maintaining high resolution.

The Vantage model reduces glare by 90 percent; the Professional model reduces glare by 94 percent. A special coating on the inside of the screen shunts static electricity through a grounding cord to minimize static and dust build up.

For more details, contact Optical Coating Laboratory Inc., 2789 Northpoint Parkway, Santa Rosa, CA 95401, 707-545-6440.

Circle 570 on Reader Service card.

Quick 'N' QWERTY

The FasType (\$39.95) typing tutor for the Models III and 4 teaches you how to type faster. This machine-language program improves typing speed and accuracy through a sequence of lessons. The program's add/change feature lets you create new typing lessons.

Contact Press A Software (Box 364, Jerome, AZ 86331, 602-634-2688) for more information.

Circle 554 on Reader Service card.

Graphics Realities

Dennis F. Tanner's *The TRS-80 Graphics Book* shows you how to incorporate graphics in your Model I/III/4 programs.

Sample programs illustrate graphics programming techniques. Tanner covers the Set, Reset, Point, Print, and POKE commands for

creating graphics. Other topics include reverse video, animation, screen designs, creating graphics using block moves, and compressed graphics.

Hardbound (\$25.45) and softbound (\$16.45) editions are available. Contact Van Nostrand Reinhold Co. Inc. (135 W. 50th St., New York, NY 10020, 212-265-8700) for more details.

Circle 558 on Reader Service card.

Tele-Shocker

The Modem Spike Protector (\$59.95) from Indus-Tool protects your equipment from transient spikes that come in over phone lines.

The device plugs into your modem to prevent errors, malfunctions, false printouts, and disk skips. It handles up to a 12,000-volt surge and carries a 70 joule rating.

For more information, contact Indus-Tool at 325 W. Huron, Chicago, IL 60610.

Circle 569 on Reader Service card.

Showing Your Colors

Hamilton Software's Colorwriter4 (\$400) integrated software for the Models 1000 and 1200 provides a word processor, graphics generator, data base manager, spreadsheet, and math calculator in full-color displays.

The program also sorts

Circle 476 on Reader Service card.

NEW

MULTIDOS 80/64 - FOR THE MODEL 4

New for your Model 4...A completely unique DOS...Not a rehash of TRSDOS 6...Not just another Model III DOS...A totally redesigned operating system for your Model 4.

- flip between 64 and 80 characters on the screen; 32 and 40 character widths also available
- runs Model III software
- use your extra 64K memory as a MEMDISK; automatically sets up MEMDISK as system disk, allowing use of the 0 drive for a data disk
- for 4P owners, never load MODELIII/A file again!
- disk I/O code written for Model 4; get fewer errors than you get using a Model III DOS
- a much faster BASIC; many enhancements and debugging tools
- over 41000 free bytes of memory in BASIC
- runs BASIC programs written for the Model III in 64 characters, or easily modified to 80 characters
- write programs using 80 character screen, function keys, and extra memory
- keyboard returns an extended character set; user controllable
- includes all the new features in 1.7 MULTIDOS

MULTIDOS 80/64 reads many disk formats, including all Model I/III DOS' and TRSDOS 6. If you're a Model III owner thinking about upgrading, this makes the transition easy.

MULTIDOS 80/64 \$99.95

NEW VERSION MULTIDOS FOR MODEL I/III \$89.95

- includes a MEMDISK - set aside part of memory as a disk file
- for double-sided drives, select either one or two volume operation
- handles 8 inch drives
- all the great features of 1.6, including compatibility with all other DOS', plus many enhancements

ZEUS EDITOR/ASSEMBLER

- supports undocumented Z80 op codes and standard pseudo-ops
- really FAST assembly
- intelligent error display - shows line number and file containing error, even when you don't print to screen
- easy line editor won't let you enter incorrect syntax
- remembers file name of source and object code; eliminates accidental overwrite
- dynamic renumber: no more "no room between lines"
- calculator mode gives answers in decimal, hex, and binary
- GET command gets files from disk with lightning speed; handles big files so fast you'll think they're small
- doesn't hog memory - lots of room for source code
- easy block move & duplication
- "pages" the screen backward & forward for easy editing
- reads and writes files in ASCII, EDTASM, and Zeus compressed format
- Model 4 version supports 80x24 lines

ZEUS for Model I, III, 4, or MAX-80 \$79.95

LAZY WRITER WORD PROCESSOR

"I would give Lazy Writer my highest recommendation..."
Stew Schneider in On-Line Today



- works with any printer
- easy to learn - used in many schools
- fast, easy-to-remember editing commands
- Mod 4 version has 80 character screen
- powerful features for advanced users
- good support - free user newsletter

LAZY WRITER FOR MODEL I, III, OR 4 \$124.95

AlphaBit Communications, Inc.

Call (313) 581-2896

13349 Michigan Ave.
Dearborn, Michigan 48126

Circle 216 on Reader Service card.

TRS-80+ MOD I, III, COCO, TI99/4a
TIMEX 1000, OSBORNE, others

GOLD PLUG - 80

Eliminate disk reboots and data loss due to oxidized contacts at the card edge connectors.
GOLD PLUG 80 solders to the board edge connector. Use your existing cables. (if gold plated)

GOLD PLUG 80 Mod I (6)		\$44.95	\$54.95
Keyboard/EI (mod I)	SPECIAL PRICES	15.95	18.95
Individual connectors		7.95	9.95
COCO Disk Module (2)		16.95	18.95
Ground tab extensions		INCL	1.00
Disk Drives (all R.S.)		7.95	9.95
Gold Disk Cable 2 Drive			29.95
Four Drive Cable			39.95
GOLD PLUG 80 Mod III (6)	COCO MODULE INSTALLATION AVAILABLE		54.95
Internal 2 Drive Cable			29.95
Mod III Expansion port			10.95
USA shipping \$1.45			Can/Mex \$4.
Foreign \$7.			TEXAS 5% TAX

Ask your favorite dealer or order direct



E.A.P. CO.

P.O. BOX 14



ORDER TODAY!

KELLER, TEXAS 76248

(817) 498-4242

+ trademark Tandy Corp

MC/VISA

Circle 213 on Reader Service card.

INCREASE KEYBOARD SPEED!

Tandy gave HyperTyper® a
★★★★ rating for both
TRS-80 and Tandy 2000



for only \$29.95

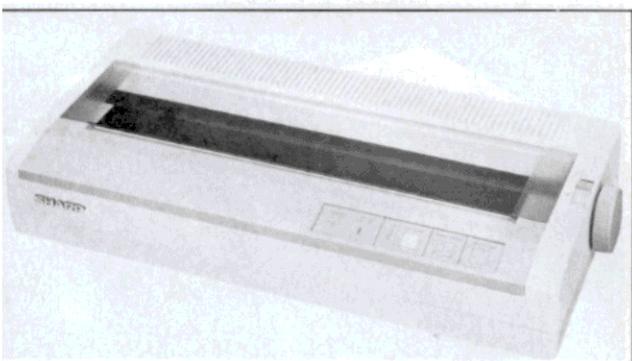
- ★ HyperTyper® is a complete software program designed to help you make the most of your computer.
- ★ HyperTyper® is under your control—you go at your own speed; not at the program's demand.
- ★ HyperTyper® uses real words, sentences and paragraphs, not nonsense syllables.
- ★ Although the text is light-hearted and fun, HyperTyper® is not a game, but a serious, powerful teaching tool.
- ★ This is a flexible, easy-to-learn and easy-to-use program that can aid everyone from novices to advanced typists.

STANDARD SOFTWARE

Suite 1600-121 S.W. Salmon St
Portland, Oregon 97204
To order by Visa/Mastercard call
1-800-547-3000 ask for Dept. 810
In Oregon and outside USA call
1-503-684-3000 (Dept 810)

TRS-80 & Tandy 2000 registered trademarks of Tandy

NEW PRODUCTS



The Sharp Model 250 thermal printer runs at 70 cps on standard printer paper.

and archives data, and creates up to seven full-screen windows. Colorwriter 4 requires 256K RAM and a color monitor. A demonstration disk is available for \$25.

For more information, contact Hamilton Software Corp., P.O. Box 791153, Dallas, TX 75379, 619-588-7448.

Circle 552 on Reader Service card.

Sharp Impressions

Sharp Electronics Corp. (10 Sharp Plaza, Paramus, NJ 07652, 201-265-5600) has introduced two thermal printers. The Model 220 (\$199) weighs 7.7 pounds and runs at up to 50 characters per second (cps). It prints at 120-dot-per-inch resolution and accepts thermal paper, bond paper, or transparencies. The unit includes a parallel interface.

The Model 250 (\$399) operates at up to 70 cps (35 cps in letter-quality mode) with 240-dot-per-inch resolution. The unit accepts roll paper, single sheets, or fan-fold paper.

Circle 565 on Reader Service card.

DMP Performer

The EC100 processor board (\$29) turns your DMP100 printer into an uppercase and lowercase character printer. The new character font provides true one-line descenders, and comes with the standard

ASCII or Model I character set.

The EC100 installs without soldering or cutting and doesn't affect graphics capabilities. It does, however, alter the underline function. The EC100B board (\$32) restores the underline function and requires some soldering.

Special-purpose EC100 boards are also available for designing your own character set. For more information, contact The Electronic Closet at 8187 Blakely Court W., Bainbridge Island, WA 98110.

Circle 567 on Reader Service card.

System at a Glance

The TRS-80 Model 100 System Reference Card (\$2.50) summarizes all Model 100 operations for computing at a glance. One side of the card covers instructions for the text, address, and schedule programs. The flip side explains Basic commands and the telecommunications program.

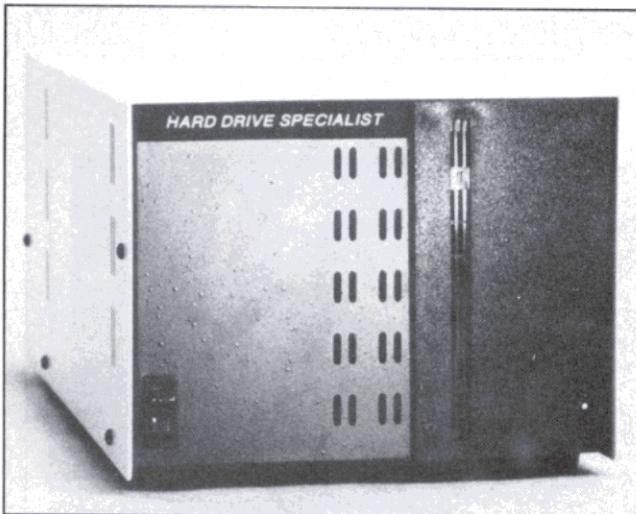
For more information, contact Eighty Computing, Box 154, Orinda, CA 94563.

Circle 564 on Reader Service card.

Routine Recipes

TRS-80 Portable Computer Subroutine Cookbook by David Busch (\$12.95) includes 70 ready-to-merge subroutines for your Basic programs.

NEW PRODUCTS



CompuKit's 30-megabyte hard drive for the Models I/III/4.

The book includes line-by-line descriptions of subroutines that cover generating music and sound effects, finance, arcade games, designing character sets, using the clock and interrupts, and other special Model 100 features.

Contact Brady Communications Co. Inc. (Routes 450 and 197, Bowie, MD 20715, 301-262-6300) for more details.

Circle 568 on Reader Service card.

Hard Driving

Hard Drive Specialist, a division of CompuKit Corp. (16208 Hickory Knoll, Houston, TX 77059, 800-231-6671; in Texas, 713-480-

6000), has introduced a 30-megabyte hard drive for the Models I, III, and 4.

The unit incorporates buffered seek logic and uses plated media that increases platter life and decreases access time by up to 75 percent over other hard drives. The 30-megabyte hard drive costs \$1,895; a secondary unit is \$1,695. An optional multiplexer lets you access the drive from up to four computers.

Circle 553 on Reader Service card.

Fast Link

The Courier and Micro-link 2,400-baud autodial, auto-answer asynchronous modems (\$895 each) trans-



The Courier 2400 from U.S. Robotics uses advanced signal filtering technology for transmission at 2400 bits per second.

Circle 151 on Reader Service card.

CONVERT YOUR TRS-80 MODEL III OR 4 INTO A DEVELOPMENT SYSTEM

Now you can develop Z-80 based, stand-alone devices such as games, robots, instruments and peripheral controllers, by using your TRS-80 as a development system. The DEVELOPMATE plugs into the expansion connector of your TRS-80 and adds PROM PROGRAMMING and IN-CIRCUIT-EMULATION capabilities to your system.

Complete instructions and sample schematics are included to help you design your own simple stand-alone microcomputer systems. THESE SYSTEMS CAN BE AS SIMPLE AS FOUR ICs: one TTL circuit for clock and reset, a Z-80, an EPROM, and one peripheral interface chip.



When the In-Circuit-Emulation cable is plugged into the Z-80 socket of your stand-alone system, the system becomes a part of your TRS-80. You can use the full power of your editor/assembler's debug and trace programs to check out both the hardware and the software. Simple test loops can be used to check out the hardware, then the system program can be run to debug the logic of your stand-alone device.

Since the program is kept in TRS-80 RAM, changes can be made quickly and easily. When your stand-alone device works as desired, you use the Developmate's PROM PROGRAMMER to copy the program into a PROM. With this PROM, and a Z-80 in place of the emulation cable, your stand-alone device will work by itself.

The DEVELOPMATE is extremely compact. Both the PROM programmer and the In-Circuit-Emulator are in one small plastic box only 3.2" x 5.4". A line-plug mounted power supply is included. The PROM programmer has a "personality module" which defines the voltages and connections of the PROM so that future devices can be accommodated. However, the system comes with a "universal" personality module which handles 2758, 2508(8K), 2716, 2516(16K), 2532(32K), as well as the new electrically alterable 2816 and 48016(16K EEPROMs).

The COMPLETE DEVELOPMATE 83 with software, power supply, emulation cable, TRS-80 cable, and "universal" personality module, is ONLY \$329!

PM2 PERSONALITY MODULE for 2732A EPROM \$15

PM3 PERSONALITY MODULE for 2764 EPROM \$15

ORION INSTRUMENTS
172 Otis Avenue, Dept. M, Woodside, CA 94062
(415) 851-1172
Master Charge and Visa phone orders accepted.
California residents please add sales tax.

Circle 468 on Reader Service card.

IT'S LIKE DISKETTES FOR 99¢ EACH!



- 100% more capacity than Single Side Diskettes
- For use in ANY 5 1/4 Disk Drive
- Just turn it over to use the other side
- Both sides are certified 100% Error Free
- 5 Year Guarantee

- MADE IN U.S.A. • TOTAL SEAM BONDING
- TYVEK JACKETS, REINFORCED HUB RINGS
- EXCEEDS INDUSTRY TECHNICAL SPECIFICATIONS

\$19.80* for 10 disks (20 sides)
only call for quantity discounts

*On all orders add \$2. for postage & handling
(\$5 Foreign). Florida res. add 5% Sales Tax.

SATISFACTION GUARANTEED
OR YOUR MONEY BACK!



TOLL FREE 1-800-642-2536

FLORIDA 305-493-8355

or send check or money order to:



nibble notch[®]
computer products

4211 NW 75th Terrace • Dept. 202 Lauderhill, FL 33319

NEW PRODUCTS

mit at 300, 1,200, or 2,400 baud.

The Microlink 2400 is designed for use with IBM PC and PC-compatible computers. The Courier 2400 interfaces with any computer that has an RS-232 interface.

Features include call duration reporting, a repeat command, modem status display, external programming switches, and on-screen help. Also included are an on-board speaker with volume control for audio line monitoring and automatic speed setting in answer mode.

Both units work with Telpac, Cross Talk, Smart-Com, and PC Talk communications software. For more details, contact U.S. Robotics Inc., 1123 W. Washington Blvd., Chicago, IL 60607, 312-733-0497.

Circle 566 on Reader Service card.

Circle 227 on Reader Service card.

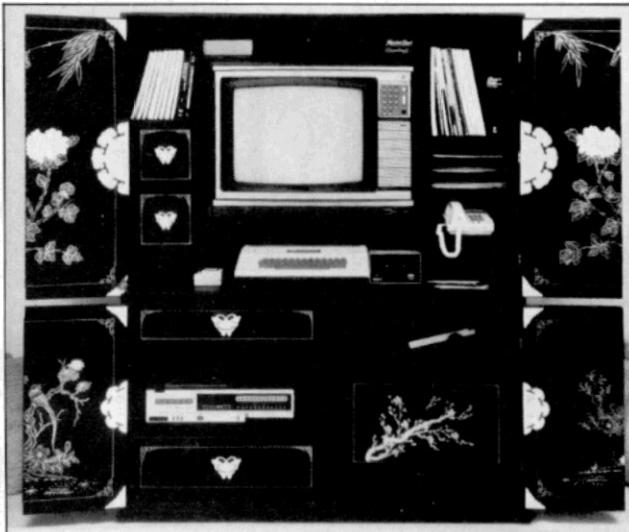
DIFFERENT TRACK

Creative Cabinetry

Creative Cabinets (5924 Veranda Drive, Springfield, VA 22152, 703-455-4958) offers a distinguished cabinet for your computer and peripherals. The Model I oriental-finish cabinet features adjustable-height shelves, drawers with dividers for disks, and compartments for a modem, telephone, manuals, and supplies.

The monitor and VCR shelves slide out for easy access, and a printer cart with a paper catch rolls out of the cabinet. Cabinets are available in burl, teak, or black lacquer with hand-painted designs and hand-etched brass ornamentation. Prices start at \$1,999.

Circle 561 on Reader Service card.



The Cadillac of computer cabinets, finished with etched brass and hand-painted designs from Creative Cabinets.

NEW And IMPROVED CP/M-68K

Treat your TRS-80 Model-16 or Enhanced Model-II or -12 to our new Version 1.2 CP/M-68K, now with:

- **Keyboard Typeahead**
- **C compiler with standard and IEEE floating point**
- **Overlay loader**
- **New utilities**
- **68000 assembler**

Option languages* — CBASIC-68K, PASCAL MT+, FORTRAN-77, PASCAL-68K, BASIC-68K

Version 1.1 users; order a language and receive your version 1.2 upgrade FREE. Upgrade alone only \$25.

Trisoft

4102 Avenue G
Austin, Texas 78751
(512) 453-2233

*Requires 256 kbytes minimum except for BASIC-68K.



NEW PRODUCTS

New Products Index

Reader Service Number	Company	Page
559	Axiom	120
568	Brady Communications Co.	124
553	Compukit Corp.	125
551	Corporate Microsystems Inc.	120
561	Creative Cabinets	126
563	Dowling Enterprises Inc.	120
564	Eighty Computing	124
567	The Electronic Closet	124
552	Hamilton Software Corp.	123
562	Hayden Book Co.	120
560	HHCI Tape Systems	120
569	Indus-Tool	123
555	Loquor Enterprises	120
557	MB International	122
556	Montezuma Micro	120
570	Optical Coating Laboratory	122
554	Press A Software	123
565	Sharp Electronics Co.	124
558	Van Nostrand Reinhold Co.	123
566	U.S. Robotics Inc.	125

New Products listings are based on information supplied in manufacturers' press releases. 80 Micro has not tested or reviewed these products and cannot guarantee any claims.

Circle 368 on Reader Service card.

Before this happens, call SAFEWARE

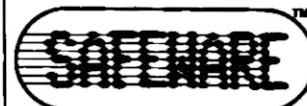
800/848-3469

(In Ohio, call
614/262-0559)

Protects your computer against theft, fire, power surges and other accidental losses. Insures your entire system for as little as \$35 a year — depending on the value of your hardware, software, and media. Full replacement after a low \$50 deductible.

We're SAFEWARE™ the first name in computer insurance. Tens of thousands of satisfied customers. Call toll-free for rates or immediate coverage.

SAFEWARE, The Insurance Agency Inc.
P.O. Box 02211
2929 N. High Street
Columbus, Ohio 43202



Circle 464 on Reader Service card.

Graphics Solutions

High-Resolution Software and Hardware

GBASIC 3.0 - Radio Shack Model 4/4P/III hi-res board owners take note of an enhanced graphics Basic; GBASIC 3.0 not only has an equivalent for each of the BASICG commands but adds a number of important new commands while using less memory. The hi-res screen can be printed on any of 20 popular printers or saved to or loaded from disk without leaving Basic. The software works with TRSDOS 1.3, 6.1.2, 6.2, LDOS, NEWDOS80, and DOSPLUS. The disk contains 40 graphics programs/files. Also included is a detailed manual which includes assembly language entry addresses. \$49.95. (Specify Model 4 or III mode or add \$10 for both.)

The following seven programs run on a Model 4/4P/III equipped with a Radio Shack graphics board and GBASIC 3.0 or a Micro-Labs Grafyx Solution board:

DRAW - A powerful full screen graphics drawing and editing program. \$39.95.

BIZGRAPH - Create business graphs from hand-entered or VisiCalc data. \$98.00.

LET'S WRITE MUSIC - An editor which displays and prints music. \$49.95.

xT.CAD - Professional drafting aid which outputs to a printer or plotter. \$449.95.

3D-PLOT - View three-dimensional data from any perspective or angle. \$39.95.

MATHPLOT - Plot equations of the form $Y=F(x)$ with auto scaling. \$39.95.

SURFACE PLOT - Plot three-dimensional equations of the form $Z=F(x,y)$. \$39.95.

GRAFYX SOLUTION. Plug-in, clip-on board enhances any Model 4/4P/III to provide $640 \times 240 / 512 \times 192$ dot graphics. Comes with over 40 programs and files including GBASIC 3.0 which adds over 20 new commands. \$199.95.

80-GRAFIX. Plug-in, clip-on board upgrades any Model III/I to provide 128 user-definable characters. Comes with over 20 programs. \$69.95 (III), \$99.95 (I).

JOY-.MOUSE. Allows a Radio Shack CoCo joystick, mouse, or touch pad to be connected to any Model 4/4P/III. Hardware provides X, Y position values from 0 to 255. A built-in speaker produces sound from the cassette port. \$99.95.



G.I.N.A. Software program for the Model 4/4P/III/I which uses the standard block graphics screen to display a window to a larger 65536×65536 dot tablet. The arrow keys are used to draw two or three-dimensional figures. The display can be scaled, shifted, or rotated in any dimension. The final picture is printed in hi-res on Radio Shack, Epson, Gemini, NEC 8023, or Prowriter printers. \$75.00.

Please specify your exact system configuration when ordering or requesting information. Payment may be by check, Visa, Mastercard, or COD. Domestic shipping is free on pre-paid orders. Texas residents add 5% sales tax.

MICRO-LABS, INC. 214-235-0915
902 Pinecrest, Richardson, Texas 75080

Upgrade Notices: Who Gets What When

Send questions specifically dealing with Tandy policies, products, and services to Ask Tandy, 80 Micro, 80 Pine St., Peterborough, NH 03458. A representative at Tandy's Fort Worth, TX, headquarters supplies all answers published here.

Q: Why do customers get upgrade notices before the Radio Shack Computer Centers do? On too many occasions I've followed your instructions to go to my local Computer Center for a required upgrade, only to be met with blank stares.

A: We try our best not to let this happen, but it has happened several times. We become over-eager to get the word out when a mandatory upgrade crops up. Sometimes it's our own fault, and once in a while it may be a case of slow or lost mail.

Tandy has a system that's supposed to prevent our mailing upgrade notices until we've shipped upgrades to Computer Centers and stocked them in our warehouse. I know it's frustrating—we'll try to do better.

Q: I have a DMP-400 printer that I use with SuperScripsit. The lowercase "y" doesn't descend properly and is totally out of proportion with the rest of the alphabet. This isn't a calamity, but it does offend the discerning eye. Employees at the local Computer Center told me they can't fix it. Is that true?

A: On some older printers, the limited number of pins (vertical dots) make it necessary to lift some lowercase letters above the baseline by one dot. This lack of true descenders is even more pronounced on some Radio Shack printers older than the DMP-400.

Early printers had 7 or 9 pins. The DMP-430 has 18, so it produces nice-looking characters, and the DMP-2100, with a 24-pin head, forms characters of near-daisy-wheel quality.

Your Computer Center is right: Your printer's design dictates the shape of the "y." It's not a defect, and it's not correctable.

Q: A recent Radio Shack flyer advertised a program called "Machine-Language Concepts for the Color Computer," catalog number 26-2670. I can't find it.

A: The program is actually called "The Illustrated Computer." It's currently in Tandy's warehouses. The stores don't keep all products in stock, so you might have to ask your local store to order it. This program is courseware, intended for school use.

Q: I have a cassette-based Model I, so my card slot is unused. Where can I get information about building my own interface boards?

A: The Model I has no "card slots." It does have a bus connector, which attaches the computer to the Expansion Interface and a few other Tandy peripherals. A number of books have been written about adding boards to Tandy and other computers, but I can't endorse any particular one; I suggest you try a library or bookstore. Tandy recommends that customers not attempt homemade hardware add-ons because of the risk of damaging the computer if you do something wrong.

Q: I'm a junior in high school in England. I'm interested in electronics, computers, and programming. I'd like to go to one of the leading colleges for computer science, and I'm wondering which ones Tandy looks at first when hiring computer specialists. And what's your estimate of the demand for computer specialists around 1990?

A: Wow! You're asking me to estimate demand six years from now, with the whole micro industry barely six years old. I don't want to go too far

out on a limb, so I'll just say that demand should be increasing between now and then. Unless so many students go into computer sciences that there's an oversupply (hard to imagine, impossible to predict), it should be a good place to be.

As for colleges, we try not to recommend specific ones. We're more interested in the courses you take. As long as you choose a recognized school, you should be OK.

Q: When Tandy stopped publishing the TRS-80 Microcomputer News, I asked to have another TRS-80 magazine fulfill my subscription. So far, I haven't received one issue. What's happening?

A: I'll answer this one in a general way, because we get questions about almost all the magazines. First, after you send us the card, don't expect an issue for about three months. That's the average. One magazine found a batch of names in January 1985 that they'd misplaced since October 1984. That won't happen often, but we're all human.

If it's more than three months since you sent in your request and you want to check on your subscription, write, don't call, Theresa Moore, Radio Shack Circulation Dept., 300 One Tandy Center, Fort Worth, TX 76102. Tell her when you sent your request and for what magazine, and how many months you have coming. Don't forget to include your name, address, and phone number.

(Editors' Note: 80 Micro has received thousands of cards from Microcomputer News subscribers. Our normal order processing period is six to eight weeks; we're shipping current issues as soon as processing is complete. Unfortunately, if you're already a current 80 Micro subscriber, we can't transfer your subscription. If your subscription has expired, however, we'll extend it.) ■

Super Spring Sale

C compiler

for the model 1 or 3 using TRSDOS, LDOS, NEWDOS, DOSPLUS, or MULTIDOS; includes full screen text editor and advanced development package

List Price \$250.00

Sale Price \$89.95

This is a full K & R standard implementation of C that includes a Unix compatible function library. The package also includes a 450 page manual with a tutorial on using the C language. If you've been wanting to learn C, this is the package you need.

Features Include

char	8 bits	initializers
short	8 bits	typedef
int	16 bits	static
unsigned	16 bits	auto
long	32 bits	extern
float	32 bits	struct/ bit fields
double	64 bits	union

Execution speed on the Model 3 for 10 iterations of the prime number program published in Byte, Jan 83, page 284.

LC Compiler 105 secs.
Alcor C 78 secs.

Special Bonus

Buy one version for \$89.95 and get the version for the other model for only \$21.

Multi-Basic compiler

for the model 1 or 3, or 4 using TRSDOS, LOOS, NEWDOS, DOSPLUS, or MULTIDOS; includes full screen text editor and advanced development package

List Price \$250.00

Sale Price \$89.95

Multi-Basic is a TRS-80 BASIC compatible compiler. The Model 4 version supports everything in the TRSDOS 6 BASIC interpreter except the COMMON statement. The same support is provided in the Model 1 and 3 versions so programs are portable. The CMD statement is the only statement from the Model 1 and 3 BASIC interpreters that is not supported.

Multi-Basic also supports advanced language features like multi-line procedures and functions, recursion, and dynamic string management (no long pauses for garbage collection).

Execution speed on the model 3 for 10 iterations of the prime number program published in Byte, Jan 83, page 286.

BASIC Interpreter	4570 secs.
Multi-Basic	89 secs.

Special Bonus

Buy one version for \$89.95 and get versions for the other two models for only \$21 each.

Get Yours Today - Sale Ends June 30th

C Compiler

Model

1 3

Circle version(s) _____
One version (\$89.95) _____
Both versions (\$110.95) _____
Add 6% sales tax (Texas only) _____
Shipping \$6 USA/\$28 foreign) _____
Total _____



1132 Commerce Systems
Richardson, TX 75081
(214) 238-8554

Name _____

Street _____

City _____

State _____

Zip _____

Country _____

Phone _____

Also available for CP/M & MSDOS

MC Visa Money Order Check COD

Card # _____ exp _____

Multi-Basic Compiler

Model

1 3 4

Circle version(s) _____
One version (\$89.95) _____
Two versions (\$110.95) _____
Three versions (\$131.95) _____
Add 6% sales tax (Texas only) _____
Shipping \$6 USA/\$28 foreign) _____
Total _____

Multi-Basic is a trademark of Alcor Systems. TRS-80 is a registered trademark of Tandy Corp. MSDOS is a trademark of MicroSoft. CP/M is a trademark of Digital Research. Unix is a trademark of Bell Laboratories. LC is a trademark of Misosys.

Introducing the Most Powerful Business Software Ever!

TRS-80™ (Model I, II, III, or 16) • APPLE™ • IBM™ • OSBORNE™ • CP/M™ • KAYPRO™



FREE--TRS-80 Mod I, III & 4
programs supplied on DosPlus
(minimum system). Complete
DosPlus also available.

The VERSABUSINESS™ Series

Each VERSABUSINESS module can be purchased and used independently,
or can be linked in any combination to form a complete, coordinated business system.

VERSA RECEIVABLES™

\$99.95

VERSA RECEIVABLES™ is a complete menu-driven accounts receivable, invoicing, and monthly statement-generating system. It keeps track of all information related to who owes you or your company money, and can provide automatic billing for past due accounts. VERSA RECEIVABLES™ prints all necessary statements, invoices, and summary reports and can be linked with VERSA LEDGER II™ and VERSA INVENTORY™.

VERSA PAYABLES™

\$99.95

VERSA PAYABLES™ is designed to keep track of current and aged payables, keeping you in touch with all information regarding how much money your company owes, and to whom. VERSA PAYABLES™ maintains a complete record on each vendor, prints checks, check registers, vouchers, transaction reports, aged payables reports, vendor reports, and more. With VERSA PAYABLES™, you can even let your computer automatically select which vouchers are to be paid.

VERSA PAYROLL™

\$99.95

VERSA PAYROLL™ is a powerful and sophisticated, but easy to use payroll system that keeps track of all government-required payroll information. Complete employee records are maintained, and all necessary payroll calculations are performed automatically, with totals displayed on screen for operator approval. A payroll can be run totally, automatically, or the operator can intervene to prevent a check from being printed, or to alter information on it. If desired, totals may be posted to the VERSA LEDGER II™ system.

VERSA INVENTORY™

\$99.95

VERSA INVENTORY™ is a complete inventory control system that gives you instant access to data on any item. VERSA INVENTORY™ keeps track of all information related to what items are in stock, out of stock, on backorder, etc., stores sales and pricing data, alerts you when an item falls below preset reorder point, and allows you to enter and print invoices directly or to link with the VERSA RECEIVABLES™ system. VERSA INVENTORY™ prints all needed inventory listings, reports of items below reorder point, inventory value reports, period and year-to-date sales reports, price lists, inventory checklists, etc.

VERSA LEDGER II™

\$149.95

VERSA LEDGER II™ is a complete accounting system that grows as your business grows. VERSA LEDGER II™ can be used as a simple personal checkbook register, expanded to a small business bookkeeping system or developed into a large corporate general ledger system **without any additional software**.

- VERSA LEDGER II™ gives you almost unlimited storage capacity (300 to 10,000 entries per month, depending on the system),
- stores all check and general ledger information forever,
- prints tractor-feed checks,
- handles multiple checkbooks and general ledgers,
- prints 17 customized accounting reports including check registers, balance sheets, income statements, transaction reports, account listings, etc.

VERSA LEDGER II™ comes with a professionally-written 160 page manual designed for first-time users. The VERSA LEDGER II™ manual will help you become quickly familiar with VERSA LEDGER II™, using complete sample data files supplied on diskette and more than 50 pages of sample printouts.

SATISFACTION GUARANTEED!

Every VERSABUSINESS™ module is guaranteed to outperform all other competitive systems, and at a fraction of their cost. If you are not satisfied with any VERSABUSINESS™ module, you may return it within 30 days for a refund. Manuals for any VERSABUSINESS™ module may be purchased for \$25 each, credited toward a later purchase of that module. All CP/M-based Computers must be equipped with Microsoft BASIC (MBSASIC or BASIC-80).

To Order:

Write or call Toll-free (800) 431-2818
(N.Y.S. residents call 914-425-1535)

- * add \$3 for shipping in UPS areas
- * add \$4 for C.O.D. or non-UPS areas

- * add \$5 to CANADA or MEXICO
- * add proper postage elsewhere

DEALER INQUIRIES WELCOME

All prices and specifications subject to change / Delivery subject to availability.

COMPUTRONICS INC.

50 N. PASCACK ROAD, SPRING VALLEY, N.Y. 10577

TRS-80 trademark Tandy Corp. - APPLE trademark Apple Corp. - IBM PC trademark IBM Corp. - OSBORNE trademark Osborne Corp. - XEROX trademark Xerox Corp. - KAYPRO trademark Non-Linear Systems, Inc. - TELEVIDEO trademark Televideo Systems, Inc. - SANYO trademark Sanyo Corp. - NEC trademark NEC Corp. - DEC trademark Digital Equipment Corp. - ZENITH trademark Zenith Corp. - TI PROFESSIONAL COMPUTER trademark Texas Instruments, Inc. - SUPERBRAIN trademark Intertec Corp. - CP/M trademark Digital Research - EPSTON trademark Epson Corp.